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United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Virginia Polytechnic
Institute and
State University

# Soil Survey of Bedford County Virginia

A 57.38:

# How To Use This Soil Survey

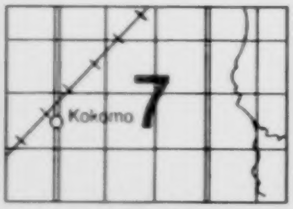
## General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

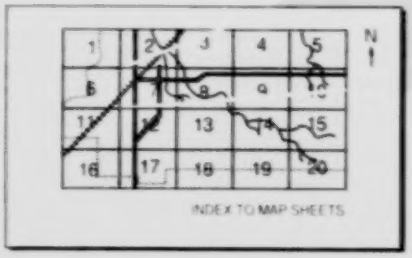
## Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



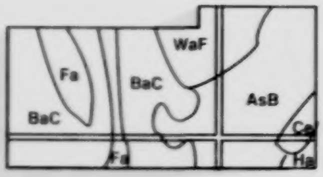
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This survey was made cooperatively by the Soil Conservation Service and the Virginia Polytechnic Institute and State University and the Bedford County Board of Supervisors. The survey is part of the technical assistance furnished to the Peaks of Otter Soil and Water Conservation District Board of Directors. This survey was financed in part by the Virginia Department of Conservation and Historic Resources and the Bedford County Board of Supervisors.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey supersedes the soil survey of Bedford Area, Virginia, published in 1901.

**Cover: In the foreground, Holstein dairy cattle graze a pasture of tall fescue on Hayesville loam, 15 to 25 percent slopes. In the background, Edneyville gravelly fine sandy loam, 25 to 60 percent slopes, extremely stony, is on the Peaks of Otter Mountain.**

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Issued July 1989

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# Foreword

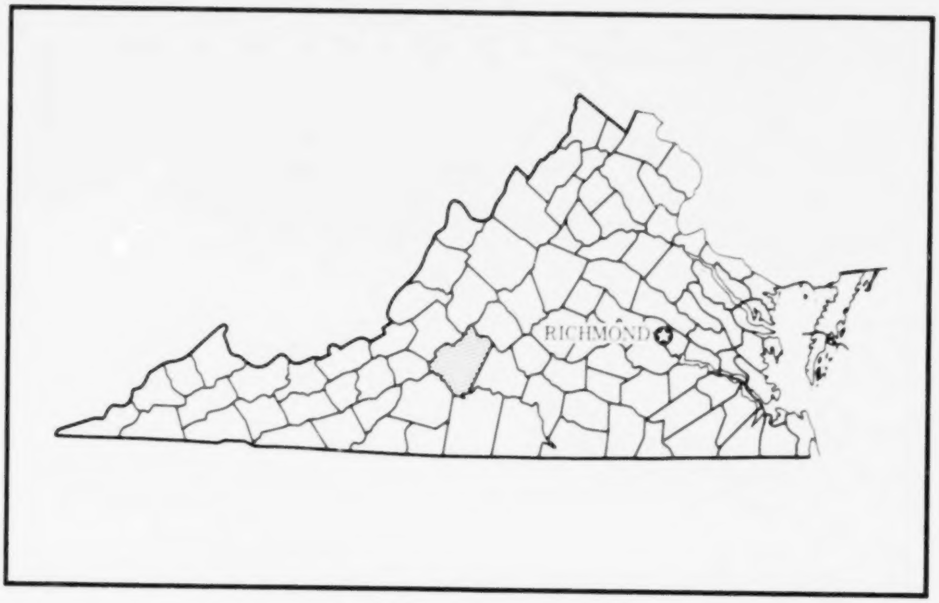
This soil survey contains information that can be used in land-planning programs in Bedford County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

George C. Norris
State Conservationist
Soil Conservation Service



Location of Bedford County in Virginia.

# Soil Survey of
# Bedford County, Virginia

By Jerry C. McDaniel, Cecil F. Bullard, Jr., and Charles D. Parker III,
Soil Conservation Service, and Gary F. Whitley and Joe E. Dove,
Virginia Polytechnic Institute and State University

United States Department of Agriculture, Soil Conservation Service
In cooperation with Virginia Polytechnic Institute and State University,
Bedford County Board of Supervisors,
and Peaks of Otter Soil and Water Conservation District

BEDFORD COUNTY is in the west-central part of Virginia. The county has a total area of about 764 square miles, or 488,902 acres. The independent city of Bedford is the county seat and is located near the center of the county. According to the 1980 census, the population of Bedford County was 34,814 and that of the city of Bedford was 5,994.

The eastern half of Bedford County is characterized by broad to narrow ridges dissected by numerous short drainageways. The ridgetops are generally gently sloping or strongly sloping. The sides of the ridges are commonly moderately steep, steep, or very steep. Streams in the eastern half generally flow southeasterly, except in the northern part they flow northeasterly.

The western half of the county is characterized by broad to narrow ridges dissected by short drainageways, scattered mountain ridges and peaks, hills, and the Blue Ridge Mountains along the western border of the county. The ridgetops are commonly gently sloping or strongly sloping. The sides of ridges are generally moderately steep, steep, or very steep. The sides of the mountains are commonly steep or very steep. Most streams in the survey area flow in a southeasterly direction, but in the northern part a few streams flow northeasterly. The county is drained by the James River, Big Otter River, Little Otter River, Goose Creek, Roanoke River, and their tributaries.

The lowest elevation in the county is about 540 feet above sea level, where Goose Creek enters Campbell County along the eastern border of Bedford County. The city of Bedford is at an elevation of about 1,017 feet. Apple Orchard Mountain, the highest point in the county, has an elevation of 4,225 feet. The Peaks of Otter, which consist of Sharp Top with an elevation of 3,862 feet and Flat Top with an elevation of 3,994 feet, are scenic landmarks.

Farming is the main economic enterprise in the county. Dairy farming and raising beef cattle are the major livestock enterprises. The major crops are corn silage, corn, small grains, and tobacco. A few small industries are located in the county. Considerable housing development is occurring throughout the county. It is especially active in the northeastern part of the county adjacent to the city of Lynchburg, in the central part near the city of Bedford, and in the southwestern part of the county, along Smith Mountain Lake.

About 18,151 acres of soils in the Jefferson National Forest along the western border of Bedford County was mapped. But, information on these soils is not included in this report. This is to be published in a National Forest Service report for the Jefferson National Forest. About 1,849 acres of soils was not mapped and was not included in this report. These soils are in National Park Service land bordering the Blue Ridge Parkway along the western border of Bedford County. Also, 4,333 areas of soils in the independent city of Bedford located in the center of the county was not mapped and was not included in this report. The National Park Service and the city of Bedford both elected not to have the soils mapped within their jurisdictions. Consequently, 468,902 acres of soils mapping in Bedford County is complete and is published in this report.

## General Nature of the County

This section provides information on the history, the climate, the physiography, relief, and drainage, the natural resources, the geologic history, the farming, the industry, the transportation, the water supplies and sanitation facilities, the recreation, and the land use trends in the county.

### History

Bedford County was formed from Lunenburg County in 1753 by the many settlers who had moved into the territory and were too far removed from the seat of government. In 1754 a part of Albemarle County was added to Bedford County. The county was named in honor of John Russell, Fourth Duke of Bedford, then a Secretary of State for Great Britain.

The first court in Bedford County met in a private home near Forest, Virginia. In 1754, 100 acres was donated for a county seat. Lots were sold and a town, named New London, began to grow. For 28 years the county seat was the commercial, social, and cultural center for a large area.

After parts of Bedford County were taken to form Campbell County in 1782 and Franklin County in 1786, Bedford County covered an area of about 774 square miles. When the town of New London was found to be in Campbell County, Bedford County needed a new county seat. In 1782 a 100-acre tract in the center of the county was donated for the new county seat, named Liberty. In 1912 its name was changed to Bedford.

In 1960 the city of Bedford annexed 2,890 acres of Bedford County, increasing its size to approximately 4,333 acres, or 6.76 square miles. In 1974 the city of Lynchburg annexed about 4,525 acres, or 7.1 square miles, of Bedford County, reducing the county to its present land area of about 488,902 acres, or 764 square miles.

### Climate

Prepared by the Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Bedford in the period 1949 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 38.8 degrees F, and the average daily minimum temperature is 28.5 degrees. The lowest temperature on record, which occurred at Bedford on January 24, 1963, is -1 degrees. In summer the average temperature is 73.8 degrees, and the average daily maximum temperature is 85.5 degrees. The highest recorded temperature, which occurred at Bedford on July 14, 1954, is 104 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 42.0 inches. Of this, 22.4 inches, or 53 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 17.3 inches. The heaviest 1-day rainfall during the period of record was 6.7 inches at Bedford on October 15, 1954. Thunderstorms occur on about 4 days each year, and most occur in summer.

The average seasonal snowfall is 19 inches. The greatest snow depth at any one time during the period of record was 22 inches. On the average, 4 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 52 percent. Humidity is higher at night, and the average at dawn is about 78 percent. The sun shines 68 percent of the time possible in summer and 48 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9.4 miles per hour, in March.

### Physiography, Relief, and Drainage

Bedford County is mostly in the Piedmont physiographic province. The mountainous, western part of the county is in the Blue Ridge Physiographic province.

The eastern two-thirds of the county consists mainly of broad to narrow ridges dissected by numerous short drainageways. The ridgetops are commonly gently sloping or strongly sloping. The sides of the ridges are generally moderately steep, steep, or very steep.

The western third of the county is characterized mainly by isolated hills, low mountain peaks, mountain ridges, and the Blue Ridge Mountains along the western border of the county. The sides of the mountains are generally steep or very steep. Most of the soils on the mountains are stony, very stony, or extremely stony.

The lowest elevation in the county is about 540 feet above sea level where Goose Creek enters Campbell County on the southeastern county line of Bedford County. The highest elevation is 4,225 feet on Apple Orchard Mountain along the western border of Bedford County. The Peaks of Otter along the western border of the county, consisting of Sharp Top with an elevation of 3,862 feet and Flat Top with an elevation of 3,994 feet, are scenic landmarks in the county. The city of Bedford in the central part of the county is at an elevation of about 1,017 feet above sea level.

The survey area is underlain by igneous, metamorphic, and sedimentary rock formations. The igenous rocks consist mainly of granite, grandiorite, diorite, and diabase. The metamorphic rocks consist of granite gneiss, biotite, and muscovite mica gneiss, and schist, quartzite, phyllite, sericite schist, hornblende gneiss, and greenstone. The sedimentary rocks consist of sandstone and shale.

The northern part of the county is drained mainly by the James River and its major tributaries of Snow Creek, Peters Creek, Battery Creek, Hunting Creek, Reed Creek, Judith Creek, and Ivy Creek. These streams generally flow easterly or northeasterly. The southern part of the county is drained by the Roanoke River and its major tributaries of Elk Creek, Big Otter, Stony Creek, Little Otter River, Machine Creek, Goose Creek, and Beaver Dam Creek. These streams generally flow southeasterly.

## Natural Resources

The mineral resources of commercial value in the county include crushed stone, sand, and masonry stones. At a large quarry on U.S. Highway 460 on the western county line, limestone is crushed into gravel and riprap. Some sand is taken for building purposes from the flood plain of the Big Otter River, where it crosses under Virginia Route 24 near the eastern county line. Granite stones found at the base of mountains in the western part of the county are used in retaining walls, for trim around houses, and in home fireplace chimneys.

Feldspar, mica, and low-grade iron ore were quarried several years ago. The feldspar and mica quarries are scattered throughout the central and eastern parts of the county. The iron ore quarries were in the mountains in the western part of the county. None of these quarries are in operation at the present time.

## Geologic History

The land surface of Bedford County is much different now from what it was more than half a billion years ago. Then, Bedford County was on the western edge of a land mass located in the eastern and central parts of Virginia. From this ancient continent came sediments, such as shale and sandstone, which formed thick accumulations.

Mountain building and metamorphism occurred later, and the sediments were altered by heat and pressure into metamorphic rocks, such as mica schist, mica gneiss, and hornblende gneiss.

The continent again sank and red shale and gray shale were deposited in the western part of the county.

This was followed by an extensive period of mountain building that raised up a chain of mountains higher than any mountains now present in the United States.

These mountains were worn down by erosion. Then a shift occurred in the drainage. Throughout the great extent of geologic time up to this point the streams had flowed to the west from the eastern continent (often referred to as the old continent of Appalachia).

As barrelling of the mountains continued, the Atlantic Ocean advanced westward across Virginia until it approached Bedford County from the east. Sediments then were deposited eastward from Bedford County.

The weight of the sediments in the Coastal Plain of eastern Virginia caused an unbalance that forced up the area of Bedford County once more.

Block faulting raised the Blue Ridge. To the east of the Blue Ridge much of the old beveled surface is preserved as the flattened tops of hills. Recent streams flowing to the east have cut into this beveled surface, forming common, fairly steep slopes above the streams.

The deeper, more weathered, mature soils are in the higher, flattened areas, and the shallower soils are on the steeper slopes near the streams.

## Farming

About 47,600 acres was used for cultivated crops in Bedford County, and about 119,000 acres was used for pasture and hay. The number of and the acreage of farms in cultivated cropland have been decreasing. The size of the remaining farms has been increasing.

The major crops grown in the county are corn, corn silage, wheat, barley, oats, rye, and tobacco. A small acreage is in soybeans. Several small apple and peach orchards are located mainly near the mountains. A few farmers have small U-pick strawberry fields.

Most of the pastures consist of tall fescue or of tall fescue and white clover. Most of the hayland is planted to orchardgrass or tall fescue. The acreage of alfalfa grown for hay has increased significantly.

Dairy farming is the major livestock enterprise in the county, followed closely by raising beef cattle. A small number of hogs, horses, and sheep are also raised.

Most of the woodland in the county consists of mixed hardwoods or mixed hardwoods and pine. Much of the harvested woodland acreage has been replanted in loblolly pine. Most of the timber is harvested for pulpwood, but some of the larger hardwoods and pines are sawed into lumber.

## Industry

Most of the major manufacturing and business establishments in Bedford County are located in or adjacent to the city of Bedford. Some of the major industries in the city produce rubber products, paper labels, poultry products, and furniture. Scattered, small businesses located in the county produce processed meats, pork products, clothing, crushed stone, and paper. Scattered throughout the county are a few small shopping centers, general stores, small livestock slaughtering plants, sawmills, and various other small business enterprises. A considerable number of people living in Bedford County work at jobs in the cities of Lynchburg and Roanoke located in adjacent counties.

## Transportation

The transportation needs of the county are served by three U.S. highways, two state highways, a series of paved or gravel, state-maintained roads, two major railroad lines, two bus lines, and two small airports. The airports offer services for small light airplanes, and charter service is available at the airport near Smith Mountain Lake. Taxi service is also available in the city of Bedford.

## Water Supplies and Sanitary Facilities

Wells throughout the county provide a water supply for farm and domestic use. Several housing developments have central water supplies from wells for residents. In other housing developments the individual homeowners have their own wells. Wells are also utilized by individual homeowners and farmsteads scattered throughout the county. Some small areas of the county have experienced difficulty in getting adequate water supplies from wells.

The city of Bedford gets most of its water supply from a reservoir on Stony Creek in the northern part of the county. The city also uses a few wells located north of the city. Two reservoirs located in the southwestern part of the county are used by the city of Roanoke for part of its water supply.

Livestock water supplies are furnished by farm ponds and by spring-fed, perennial streams throughout the county. Water for livestock on most farms is rarely a problem.

The county maintains one sanitary landfill for disposal of solid waste. The city of Bedford has its own sanitary landfill located partly in the city and partly outside of the city, in the county.

Septic tank absorption fields are used for disposal of domestic sewage throughout the county. The city of Bedford has a central sewage treatment system for most of its residents. Many of the dairy farmers have constructed manure holding systems to prevent animal wastes from polluting the streams.

## Recreation

The soils in most areas of the county are suited to various types of outdoor recreation. Hunting and fishing are enjoyed by many residents as well as nonresidents. Facilities are available for sightseeing, camping, picnicking, hiking, boating, golf, swimming, and other types of outdoor recreation.

The mountains in the western part of the county offer facilities for many types of outdoor recreation. Two large lakes along the southern border of the county provide many opportunities for water sports.

## Land Use Trends

Bedford County covers a total area of 488,902 acres. Some 18,151 acres in the Jefferson National Forest and 1,849 acres in National Park Service land were not included in this report. Therefore, the area surveyed and included in this report consists of 468,902 acres.

The survey area consists of about 47,600 acres of cropland, 119,000 acres of pasture and hayland, 272,300 acres of privately owned woodland, 1,200 acres of mostly woodland in Smith Mountain Lake State Park, 11,550 acres of water, and about 17,800 acres of land developed or being developed for houses and small businesses throughout the county.

Woodland is the dominant land use in the survey area. The acreage in woodland has been increasing in recent years as some cleared cultivated land and pastureland has been converted to woodland. This trend is expected to continue. The woodland is composed of mixed hardwoods or of mixed hardwoods and pine. Some tracts of woodland are being replanted with loblolly pine. The woodland is used mainly for pulpwood for paper, and some large trees are cut for lumber.

Farming is the second major land use in the county. In past years much of the cleared land was used for cultivated crops, but the acreage in cultivated crops has been steadily decreasing. A considerable acreage of cultivated land has been converted to pasture, hayland, woodland, housing developments, recreation, and other uses. The number of farms has decreased, but the size of farms has increased. This trend is expected to continue. The acreage used for pasture and hayland has increased because of an increase in the number of dairy cattle, beef cattle, horses, and other livestock.

Considerable acreages of cultivated cropland, pastureland, and woodland are being used for housing developments and small businesses in several areas of the county. Significant urbanization is occurring in the northeastern part of the county adjacent to the city of Lynchburg and in the vicinity of Forest. Development is occurring on all sides of the city of Bedford in the central part of the county. Housing developments, marinas, and recreation facilities have been built along the southern border of the county near Leeville Lake and Smith Mountain Lake. Increased housing development has been occurring in the southwestern part of the county along the county line and in the vicinity of Stewartsville. Scattered housing development is occurring throughout all parts of the county, including some of the mountains. These trends are expected to continue.

One of the major land use trends is the conversion of farmland to housing developments. The population in the county is expected to continue to increase, thus increasing future urban development in all areas of the county.

## How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material has few or no roots or other living organisms and has been changed very little by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

This soil survey supersedes the soil survey of Bedford Area, Virginia, published in 1901 *(4)*. This survey provides additional information and contains larger maps that show the soils in greater detail.

## Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

# General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

In areas along the borders of Bedford County the boundaries on the general soil map and the names of the general soil map units do not match those of adjoining counties. These discrepancies exist because of differences in the detail of mapping, changes in soil classification, and different proportions of the same soil or soils in adjoining counties. Where some of these conditions exist, the adjoining counties match with similar kinds of soils.

## Soil Descriptions

### 1. Dekalb

*Moderately deep, well drained, moderately steep to very steep, very stony soils that have a loamy subsoil; formed in weathered sandstone and quartzite*

This map unit consists of side slopes on a part of the Blue Ridge Mountains and finger ridges extending out a short distance from the base of the mountains. The mountain side slopes are rather broad, and steep and very steep, and are dissected by drainageways. The finger ridges extending out from the base of the mountains have rather narrow, moderately steep or strongly sloping ridgetops and moderately steep to very steep side slopes. Slopes range from about 15 to 60 percent. Quartzite stones, cobbles, and rock outcrops are on the surface in most areas of the soils in this map unit. Numerous drainageways join together to form small perennial streams, which drain this map unit. All of the acreage of this map unit is woodland. The dominant natural vegetation is mostly mixed hardwoods, some scattered pine, and mountain laurel.

This map unit makes up about 0.5 percent of the survey area. It is about 74 percent Dekalb soils and 26 percent minor soils, mostly Gunstock, Laidig, Sequoia, and Berks soils.

Dekalb soils are on ridgetops and sides of the Blue Ridge Mountains. They have a surface layer of very stony sandy loam that is very dark grayish brown in the upper part and dark yellowish brown in the lower part. The subsoil is yellowish brown very channery sandy loam. The substratum is yellowish brown extremely channery sandy loam. It is underlain by sandstone and quartzite.

The minor soils in the map unit are moderately deep, well drained Berks, Gunstock, and Sequoia soils on the base of the mountain side slopes and on the sides of the finger ridges extending out from the base of the mountains. Other minor soils are very deep, well drained Laidig soils on ridgetops and sides of finger ridges.

All of the acreage of this map unit is woodland. These soils are among some of the soils in the county that are least suited to cultivated crops. The main limitations are the moderately steep, steep, and very steep slopes, the very stony surface layer, droughtiness, and low fertility.

Potential productivity for trees on these soils is moderate. The dominant tree species are oaks, Virginia pine, and shortleaf pine. The major limitations to woodland use and management are numerous rock fragments in the soils, droughtiness, erosion potential, the equipment limitation, seedling mortality, and stones on the surface.

In large areas the soils in this map unit are generally not suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields, sewage lagoons, and trench type sanitary landfills. The soils are poorly suited to farm ponds mainly because of slope and seepage into the underlying fractured bedrock. In most areas the major limitations to these uses are slope, depth to bedrock, and stones on the surface.

### 2. Sequoia-Berks-Braddock

*Moderately deep and very deep, well drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered shale or in colluvial* *sediments*

This map unit consists of long, broad to narrow ridges dissected by short drainageways. The ridgetops are commonly gently sloping or strongly sloping, and the sides of the ridges are mostly strongly sloping to very steep. Slopes dominantly range from 2 to 60 percent. Numerous short drainageways join together to form small perennial streams and creeks that flow in meandering courses through narrow flood plains. About 40 percent of the acreage of this map unit has been cleared for cultivated crops, pasture, and hay. In uncleared areas the dominant natural vegetation is mostly mixed hardwoods and some scattered pine.

This map unit makes up about 3 percent of the survey area. It is about 43 percent Sequoia soils, 20 percent Berks soils, 11 percent Braddock soils, and 26 percent minor soils. The minor soils are Laidig, Thurmont, State, Toccoa, and Chewacla soils.

Sequoia soils are on ridgetops and sides of ridges. They are moderately deep and well drained. They have a clayey and loamy subsoil and formed in weathered products of shale.

Berks soils are on ridgetops, sides of ridges, and the base of some mountain side slopes. They are moderately deep and well drained. They have a loamy subsoil and formed in weathered products of shale.

Braddock soils are on ridgetops, sides of ridges, and toe slopes of some mountains. They are very deep and well drained. They have a clayey subsoil and formed in colluvial sediments.

The minor soils in the map unit include very deep, well drained Laidig soils on ridgetops, sides of drainageways, and toe slopes of mountains and very deep, well drained Thurmont soils commonly on ridgetops, sides of ridges, and toe slopes of mountains. Other minor soils are very deep, well drained State soils on low stream terraces; very deep, somewhat poorly drained Chewacla soils in concave areas on flood plains; and very deep, well drained and moderately well drained Toccoa soils on flood plains adjacent to streams.

Much of the cleared acreage of the soils in this map unit is suitable for cultivated crops and pasture. If cleared of trees some of the gently sloping and strongly sloping areas are also suitable. Generally, in the less steep areas the soils are moderately well suited to cultivated crops and pasture. The major farm enterprises are dairy farming and raising beef cattle.

About 10 percent of the cleared acreage is used for the major cultivated crops, namely corn silage, corn, and small grains. These crops are grown mainly on the gently sloping and strongly sloping ridgetops and strongly sloping sides of drainageways. In some areas cultivation is impractical because of considerable amounts of gravel, cobbles, and channers in the surface layer. The major limitations of these soils to cultivated crops are slope, erosion potential, droughtiness, acidity, and low natural fertility.

About 90 percent of the cleared acreage is used for pasture or hay. Most of the pastures consist dominantly of tall fescue or a mixture of tall fescue and clovers. The major hay crops are orchardgrass, tall fescue, and alfalfa. The major limitations of these soils for pasture and hay are slope, cobbles on the surface, droughtiness, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes, preventing overgrazing, and weed control.

About 60 percent of the acreage of this map unit is woodland. Potential productivity for trees on these soils is moderate to moderately high. The dominant tree species are oaks, yellow-poplar, hickory, Virginia pine, and shortleaf pine. The major limitations to woodland use and management are slope, the erosion hazard, the equipment limitation, rock fragments in some soils, and seedling mortality.

In large areas the soils in this map unit are generally not suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields, sewage lagoons, and sanitary landfills. On many of these soils the major limitations to these uses are slope, depth to bedrock, seepage, the moderately slowly permeable subsoil, and low strength.

### 3. Edneytown-Ashe

*Very deep and moderately deep, well drained and somewhat excessively drained, strongly sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered granite or granite gneiss or in both*

This map unit consists of the Blue Ridge Mountains and scattered mountain ridges and peaks of lower elevations dissected by drainageways, in the western part of the county. The mountain ridgetops are generally rather narrow and strongly sloping or moderately steep. The mountain sides are mostly moderately steep to very steep. Slopes range from about 7 to 60 percent. In most areas of these soils granite stones, cobbles, boulders, and granite outcrop are on the surface. Numerous drainageways join together to form small perennial streams that are the headwaters for many of the creeks and rivers in the county. About 5 percent of the acreage of this map unit has been cleared for pasture. In uncleared areas the dominant natural vegetation is mostly mixed hardwoods, some scattered pine, and mountain laurel.

This map unit makes up about 12 percent of the survey area. It is about 65 percent Edneytown soils, 9 percent Ashe soils, and 26 percent minor soils. The minor soils are Hayesville, Edneyville, and Braddock soils.

Edneytown soils are commonly on mountain ridgetops and mountain sides. They are very deep and well drained and have a clayey or loamy subsoil. They are underlain by granite and granite gneiss. In some small areas few or no granite stones are on the surface.

Ashe soils are on the sides of mountains and on a few narrow mountain ridgetops. They are moderately deep and somewhat excessively drained soils and have a loamy subsoil. They are underlain by granite and granite gneiss. In some areas few or no granite stones are on the surface.

The minor soils in the map unit are very deep, well drained Hayesville soils on the lower side slopes of mountains, very deep, well drained Edneyville soils on mountain ridgetops and mountain sides at the highest elevations, and very deep, well drained Braddock soils at the base of mountains.

On the acreage that has been cleared of trees and stones the soils in this map unit are suited only to use as pasture and as apple orchards. These soils are the least suited soils in the county to cultivated crops and pasture mainly because of slope and stones on the surface. Beef cattle and apple orchards are the major farm enterprises. The orchards, however, are of very limited extent.

About 5 percent of the cleared acreage is in scattered patches on ridgetops of mountains and at the base of mountains. It is used as house sites, for family gardens, and as a few apple orchards.

About 95 percent of the cleared acreage is used for pasture and a small amount of hay. This acreage is on some of the less sloping ridgetops and at the base of mountains. In many cleared areas the stones have been entirely or partly removed. However, the rock outcrops and stones in many of the cleared areas impede the proper management of the soils for pasture. Most of the pastures consist dominantly of tall fescue. The major limitations of these soils for pasture and hay are slope, stones, rock outcrops, droughtiness, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes, weed control, and preventing overgrazing.

About 95 percent of the acreage of this map unit is woodland. Potential productivity for trees on these soils is moderately high or high. The dominant tree species are oaks, yellow-poplar, hickory, Virginia pine, and shortleaf pine. The major limitations to woodland use and management are slope, stones on the surface, the erosion hazard, the equipment limitation, and seedling mortality.

In large areas the soils in this map unit are generally not suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields, sewage lagoons, and sanitary landfills. On most of these soils the major limitations to these uses are slope, stones on the surface, seepage, and depth to bedrock.

### 4. Hayesville-Edneytown-Braddock

*Very deep, well drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered granite or granite gneiss, in both, or in colluvial sediments*

This map unit consists of long, broad to narrow ridges dissected by short drainageways and a few scattered prominent hills. The ridgetops are commonly gently sloping or strongly sloping and the sides of ridges are mostly moderately steep to very steep. Slopes range from about 2 to 60 percent. In some relatively small areas of these soils, especially at the base of mountains, granite stones cover much of the surface. This map unit is drained by small perennial streams, the James River, Battery Creek, Reed Creek, Big Otter River, Little Otter River, Goose Creek, Beaverdam Creek, and the Roanoke River. About 50 percent of the acreage of this map unit has been cleared for cultivated crops, pasture, and hay. In uncleared areas the dominant natural vegetation is mostly mixed hardwoods and partly scattered pine.

This map unit makes up about 28 percent of the survey area. It is about 63 percent Hayesville soils, 20 percent Edneytown soils, 10 percent Braddock soils, and 7 percent minor soils. The minor soils are Ashe, Thurmont, State, Toccoa, and Chewacla soils.

Hayesville soils are on ridgetops and on the sides of ridges. They are very deep and well drained, and have a clayey subsoil. They are underlain by granite and granite gneiss. In some areas granite stones are on the surface.

Edneytown soils are on ridgetops and sides of ridges. They are very deep and well drained soils and have a loamy subsoil. They are underlain by granite and granite gneiss. In some areas granite stones are on the surface.

Braddock soils are on ridgetops, sides of ridges, and toe slopes of some mountains. They are very deep and well drained, and have a clayey subsoil that has mottles in the lower part. They are underlain by colluvial or alluvial sediments. In some areas, especially on the toe slopes of mountains or in the vicinity of mountains, granite stones are on the surface.

The minor soils in the map unit are moderately deep, somewhat excessively drained, very stony Ashe soils on the sides of ridges; very deep, well drained Thurmont soils on ridgetops, sides of ridges, and toe slopes of mountains; very deep, well drained State soils on low stream terraces; very deep, somewhat poorly drained Chewacla soils in concave areas of flood plains; and very deep, well drained and moderately well drained Toccoa soils on flood plains adjacent to streams.

In much of the cleared acreage the soils in this map unit are suitable for cultivated crops and pasture. If cleared of trees, some of the gently sloping and strongly sloping areas are also suitable. The soils in this map unit are among the better suited soils in the county to cultivated crops and pasture. The major farm enterprises are dairy farming and raising beef cattle.

About 20 percent of the cleared acreage is used for corn silage, corn, and small grains and as apple orchards. These crops are grown mainly on the gently sloping and strongly sloping ridgetops and strongly sloping sides of drainageways. The major limitations of these soils to cultivated crops are slope, erosion potential, acidity, low natural fertility, and the very stony surface layer.

About 80 percent of the cleared acreage is used for pasture and hay. Some small areas near or at the base of mountains are more difficult to properly manage for pasture or hay because of considerable stones on the surface. Most of the pastures consist dominantly of tall fescue or a mixture of tall fescue and clovers. The major crops are orchardgrass, tall fescue, and alfalfa. The major limitations of these soils to pasture or hay are slope, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes, preventing overgrazing, and weed control.

About 50 percent of the acreage of this map unit is woodland. Potential productivity for trees on these soils is moderately high or high. The dominant tree species are oaks, yellow-poplar, hickory, maple, Virginia pine, and shortleaf pine. The major limitations to woodland use and management are slope, the equipment limitation, and the erosion hazard.

In large areas the soils in this map unit are well suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields, sewage lagoons, and sanitary landfills. On most of these soils the major limitations to these uses are slope and the clayey subsoil.

### 5. Gunstock

*Moderately deep, well drained, strongly sloping to steep soils that have a loamy subsoil; formed in weathered phyllite*

This map unit consists of short, narrow ridges and low mountain ridges dissected by short drainageways, in the western part of the county. The ridgetops are commonly narrow and strongly sloping. The sides of ridges and the sides of mountains are dominantly moderately steep and steep. Slopes commonly range from 7 to 45 percent. Phyllite channers and a few quartzite cobbles are common on the surface. Numerous drainageways join together to form small perennial streams. About 5 percent of the acreage of this map unit has been cleared. In uncleared areas the dominant natural vegetation is mostly mixed hardwoods and partly scattered pine.

This map unit makes up about 3 percent of the survey area. It is about 96 percent Gunstock soils and 4 percent minor soils. Gunstock soils are on low mountain ridgetops, sides of mountains, and ridges and sides of ridges commonly near the base of mountains. They are moderately deep and well drained and have a loamy subsoil. They are underlain by phyllite. In some areas quartzite cobbles and stones are scattered on the surface. The minor soils are moderately deep, well drained, very stony Dekalb soils on the sides of mountains and very deep, well drained Edneytown soils on the sides of mountains or ridges.

In the cleared acreage the soils in this map unit are suited mainly to pasture and hay. If cleared of trees, some of the gently sloping and strongly sloping areas are also suitable for pasture and hay. The main farm enterprise is raising beef cattle. These soils are among the least suited soils in the county to cultivated crops because of slope, the channery surface layer, and low fertility.

Most of the cleared acreage is scattered on gently sloping or strongly sloping ridgetops and on moderately steep sides of ridges. In a small acreage the cleared areas are used as house sites and as family gardens, but in most areas they are used for pasture.

About 95 percent of the cleared acreage is used for pasture and a very small amount of hay. Some small areas are more difficult to properly manage for pasture or hay because of cobbles and scattered stones on the surface. Most of the pastures consist dominantly of tall fescue. The major limitations of these soils for pasture or hay are slope, the channery surface layer, droughtiness, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes, preventing overgrazing, and weed control.

About 95 percent of the acreage of this map unit is woodland. Potential productivity for trees on the soils is moderate. The dominant tree species are oak, hickory, beech, Virginia pine, and shortleaf pine. The major limitations to woodland use and management are slope, restricted rooting depth, the erosion hazard, the equipment limitation, seedling mortality, and windthrow hazard.

In large areas the soils in this map unit are generally not suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields, sewage lagoons, and trench type sanitary landfills. On most of the soils the major limitations to these uses are slope, depth to bedrock, and rock fragments on the surface.

### 6. Cecil-Madison

*Very deep, well drained, gently sloping to steep soils that have a clayey subsoil; formed in weathered mica schist and mica gneiss, or in both and weathered granite gneiss*

This map unit consists of long, broad to narrow ridges dissected by short drainageways. The ridgetops are commonly gently sloping or strongly sloping and the sides of the ridges are mostly strongly sloping to steep. Slopes dominantly range from about 2 to 45 percent. In many areas a large percentage of the soils on the sides of the ridges are severely eroded. The soils in the map unit are drained by small perennial streams, the James

River, Judith Creek, Ivy Creek, Big Otter River, Goose Creek, and the Roanoke River. About 60 percent of the acreage of these soils has been cleared for cultivated crops, pasture, and hay. In uncleared areas the dominant natural vegetation is mostly mixed hardwoods and partly scattered pine.

This map unit makes up about 48 percent of the survey area. It is about 43 percent Cecil soils, 26 percent Madison soils, and 31 percent minor soils. The minor soils are Poindexter, Cullen, Sweetapple, Mecklenburg, Turbeville, and Toccoa soils.

Cecil soils are on ridgetops and sides of ridges along drainageways. They are very deep and well drained and have a clayey subsoil. They are underlain by mica schist, mica gneiss, and granite gneiss.

Madison soils are on the sides of ridges. These soils are very deep, well drained, and dominantly severely eroded, and have a clayey subsoil that has many mica flakes. They are underlain by mica schist and mica gneiss.

The minor soils in the map unit are very deep, well drained Cullen and Turbeville soils on ridgetops and sides of ridges; deep, well drained Poindexter and Mecklenburg soils on ridgetops and sides of ridges; moderately deep, somewhat excessively drained Sweetapple soils on sides of ridges; and very deep, well drained and moderately well drained Toccoa soils on flood plains adjacent to streams.

Much of the cleared acreage is suitable for cultivated crops and pasture. If cleared of trees, some of the gently sloping and strongly sloping areas are also suitable. The soils in this map unit are among the better suited soils in the county to cultivated crops and pasture. The major farm enterprises are dairy farming and raising beef cattle.

About 25 percent of the cleared acreage is used for corn silage, corn, small grains, and tobacco. These crops are grown mainly on the gently sloping and strongly sloping ridgetops and strongly sloping sides of ridges. The major limitations for cultivated crops are slope, erosion potential, droughtiness, acidity, and low natural fertility.

About 75 percent of the cleared acreage is used for pasture or hay. Most areas of the severely eroded soils on the moderately steep and steep sides of ridges are used for pasture. Most of the pastures consist dominantly of tall fescue or of a mixture of tall fescue and clovers. The major hay crops are orchardgrass, tall fescue, and alfalfa. The major limitations of the soils for pasture and hay are slope, effects of past severe erosion, droughtiness, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes, preventing overgrazing, and weed control.

About 40 percent of the acreage of this map unit is woodland. Potential productivity for trees on the soils is moderate or moderately high. The dominant tree species are oaks, yellow-poplar, hickory, maple, Virginia pine, and shortleaf pine. The major limitations to woodland use and management are slope, the equipment limitation, and erosion potential.

In large areas the soils in this map unit are well suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields, sewage lagoons, and sanitary landfills. On most of the soils the major limitations to these uses are slope and the clayey subsoil.

### 7. Iredell-Poindexter-Mecklenburg

*Very deep and deep, somewhat poorly drained to well drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered hornblende, hornblende gneiss, greenstone, or diabase*

This map unit consists of long, broad to narrow ridges dissected by short drainageways. The ridgetops are commonly gently sloping or strongly sloping and the sides of the ridges are mostly strongly sloping to very steep. Slopes dominantly range from 2 to 60 percent. The soils in this map unit are drained by the Big Otter River and Goose Creek. About 10 percent of the acreage of this map unit has been cleared for cultivated crops, pasture, and hay. In uncleared areas the dominant natural vegetation is mostly mixed hardwoods and cedar and partly scattered pine.

This map unit makes up about 2.2 percent of the survey area. It is about 40 percent Iredell soils, 20 percent Poindexter soils, 18 percent Mecklenburg soils, and 22 percent minor soils. The minor soils are mainly Cecil, Madison, Cullen, Helena, and Toccoa soils.

Iredell soils are on ridgetops and sides of ridges. They are very deep, and somewhat poorly drained or moderately well drained and have a clayey subsoil. They are underlain by hornblende, hornblende gneiss, diabase, or greenstone.

Poindexter soils are on ridgetops and sides of ridges. They are deep and well drained, and have a loamy subsoil. They are underlain by hornblende, hornblende gneiss, or greenstone.

Mecklenburg soils are on ridgetops and sides of ridges. They are deep and well drained soils, and have a clayey subsoil. They are underlain by hornblende, hornblende gneiss, or greenstone.

The minor soils in the map unit are very deep, well drained Cecil and Cullen soils on ridgetops and sides of ridges; very deep, well drained Madison soils on sides of ridges; deep, moderately well drained Helena soils on ridgetops and sides of ridges along drainageways; and very deep, well drained and moderately well drained Toccoa soils on flood plains adjacent to streams.

Much of the cleared acreage in this map unit is suitable for cultivated crops and pasture. Even if cleared, most of the gently sloping and strongly sloping areas in woodland are generally poorly suited to cultivated crops. The main farm enterprise is raising beef cattle.

About 20 percent of the cleared acreage is used for corn and small grains. These crops are grown mainly on the gently sloping and strongly sloping ridgetops and strongly sloping sides of drainageways. The major limitations for cultivated crops are slope, erosion potential, droughtiness, the perched seasonal high water table, and low natural fertility. These soils are not as acidic and are higher in soil reaction than the other soils in the county.

About 80 percent of the cleared acreage is used for pasture or hay. Most of the pastures consist dominantly of tall fescue or a mixture of tall fescue and clovers. The major hay crops are orchardgrass and tall fescue. The major limitations for pasture or hay are slope, droughtiness, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes, preventing overgrazing, and weed control.

About 90 percent of the acreage of this map unit is woodland. Potential productivity for trees on the soils is dominantly moderate. The dominant tree species are oaks, yellow-poplar, hickory, cedar, Virginia pine, and shortleaf pine. The major limitations to woodland use and management are slope, the heavy clay subsoil, erosion potential, the equipment limitation, and seedling mortality.

In large areas the soils in this map unit are generally poorly suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields, sewage lagoons, and sanitary landfills. The major limitations of the soils to these uses are slope, slow permeability in the subsoil, clayey subsoil, depth to bedrock, the seasonal high water table, seepage, low strength, and shrinking and swelling.

### 8. Nason-Tatum-Manteo

*Deep and shallow, well drained and excessively drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered sericite schist*

This map unit consists of two low mountain ridges and of long, broad to narrow ridges dissected by short drainageways. Ridgetops are commonly gently sloping or strongly sloping, and the sides of ridges are mostly moderately steep to very steep. Slopes range from 2 to 60 percent. Quartz gravel and sericite channers are on the surface of these soils. Areas of this map unit are drained mainly by small perennial streams and creeks, Goose Creek, and the Roanoke River. About 5 percent of the acreage has been cleared. In uncleared areas the dominant natural vegetation is mostly mixed hardwoods and partly mountain laurel and scattered pine.

This map unit makes up about 6 percent of the survey area. It is about 39 percent Nason soils, 37 percent Tatum soils, 10 percent Manteo soils, and 14 percent minor soils. The minor soils are mainly Cullen, Turbeville, Poindexter, and Toccoa soils.

Nason soils are on ridgetops, sides of ridges, mountain ridgetops, and sides of some low mountain ridges. They are deep and well drained, and have a clayey subsoil that has fragments of sericite schist in amounts that increase with depth. They are underlain by multicolored sericite schist.

Tatum soils are on ridgetops and the sides of ridges. They are deep and well drained, and have a clayey subsoil. They are underlain by multicolored sericite schist.

Manteo soils are on the sides of ridges and of low mountains. They are shallow and excessively drained, and have a loamy subsoil that has many fragments of sericite schist.

The minor soils in the map unit are very deep, well drained Cullen soils on ridgetops and the sides of ridges, very deep, well drained Turbeville soils on ridgetops and the sides of some ridges mostly near creeks and rivers, deep, well drained Poindexter soils mostly on the sides of ridges, and very deep, well drained and moderately well drained Toccoa soils on narrow flood plains adjacent to streams.

About 95 percent of the acreage of this map unit is woodland.

Most of the cleared acreage is suitable for cultivated crops and pasture. If cleared, some of the gently sloping and strongly sloping areas of the soils in woodland are also suitable for crops and pasture. Generally, the gently sloping and strongly sloping soils in this map unit are moderately well suited to cultivated crops and pasture. The major farm enterprise is raising beef cattle.

A few cleared areas are used for cultivated crops. The main limitations are droughtiness, low natural fertility, acidity, and the gravelly surface layer. It is difficult to reduce acidity and to maintain proper soil reaction.

Almost all of the cleared acreage of this map unit is used for pasture grasses, mainly tall fescue. A small acreage is used as hayland of mostly tall fescue. On pasture and hayland, the main limitations are slope, droughtiness, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes, preventing overgrazing, and weed control.

Potential productivity for trees on the soils is moderate or moderately high. The dominant tree species are oak, beech, hickory, Virginia pine, and shortleaf pine. A few scattered tracts have been replanted with loblolly pine. The main limitations to woodland use and management are slope, restricted rooting depth, erosion potential, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition.

In very large areas the soils in this map unit are generally well suited to building site development and to use as sites for sanitary facilities, such as septic tank absorption fields and sewage lagoons. On most of the soils the main limitations to these uses are slope, depth to bedrock, seepage, and low strength.

# Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cecil fine sandy loam, 2 to 7 percent slopes, is one of several phases in the Cecil series.

Most map units include small scattered areas of soils, generally less than 4 acres in size, other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

## Soil Descriptions

**1B—Altavista fine sandy loam, 2 to 7 percent slopes.** This is a very deep, moderately well drained, gently sloping soil on narrow to broad, slightly convex rises on low stream terraces in the Piedmont. Slopes are smooth. Areas of the soil are commonly long and narrow or irregular in shape. They range from 4 to about 15 acres in size. The soil is subject to rare flooding.

Typically, the surface layer is yellowish brown fine sandy loam about 8 inches thick. The subsoil is about 64 inches thick. It is dominantly yellowish brown clay loam to a depth of about 30 inches and mottled, light brownish gray sandy clay loam to a depth of 46 inches. Below that, it is mottled, yellowish brown clay loam to a depth of 65 inches and mottled, strong brown sandy clay loam to a depth of 72 inches or more.

Included with this soil in mapping are small areas of Chewacla, State, Thurmont, and Toccoa soils and soils that are similar to the Altavista soil but that have more clay in the subsoil or have a subsoil that is dominantly mottled, gray clay or clay loam. Also included are small areas of soils that have slopes of 7 to 15 percent, small wet spots, and seep areas. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 18 to 30 inches
*Flooding:* Rare and very brief

A large acreage of this soil is used for pasture or hay. A small acreage is used for cultivated crops. The rest is woodland. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. In some years the seasonal high water table delays spring planting, affects crop selection, and interferes with the harvest in fall. Incorporating organic matter into the soil and cultivating the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to control erosion, and to increase productivity. Tile drainage lowers the seasonal high water table.

This soil is well suited to pasture and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, ladino clover, birdsfoot trefoil, and lespedeza. It is not suited to alfalfa. On pasture and hayland, the major limitations are the seasonal high water table, acidity, and low natural fertility. Lime and fertilizer help both to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is very high. Estimated average annual production of wood per acre is 133 cubic feet. The seasonal high water table limits woodland use and management. The major woodland management problem is the equipment limitation. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production.

The main limitations of this soil for most urban uses are the seasonal high water table, flooding, cutbanks caving in, and slope. The seasonal high water table and flooding limit use of the soil as sites for sewage lagoons and dwellings with basements, and for local roads and streets. The seasonal high water table limits its use as sites for septic tank absorption fields, trench type sanitary landfills, and daily cover for sanitary landfills, as roadfill, and for establishing lawns and landscaping. Flooding limits its use as sites for dwellings without basements and for small commercial buildings. The seasonal high water table and cutbanks caving in limit its use for shallow excavations.

This soil is in capability subclass IIe.

**2D—Ashe gravelly sandy loam, 15 to 25 percent slopes, very stony.** This is a moderately deep, somewhat excessively drained, moderately steep soil on the sides of mountains and of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly long, and narrow or wide, or they are irregular in shape. They range from 4 to about 500 acres in size. Granite stones are scattered on about 3 percent of the surface.

Typically, the surface layer is dark yellowish brown gravelly sandy loam about 5 inches thick. The subsoil is yellowish brown gravelly sandy loam about 18 inches thick. Hard granite bedrock is at a depth of 23 inches.

Included with this soil in mapping are small areas of Edneytown and Edneyville soils and soils that are similar to this Ashe soil but that have more rock fragments in the subsoil, have more clay in the subsoil, or are deeper to bedrock. Also included are small areas of soils that have slopes of less than 15 percent or more than 25 percent and small gullied areas. Also included are areas of soils that have no stones on the surface, small areas of gravelly or cobbly soils, and areas of granite rock outcrops. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Very low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for cultivated crops, pasture, and hay.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high, and is a major management concern. Slope and stones on the surface impede tillage.

This soil is moderately well suited to pasture plants, such as tall fescue, bermudagrass, white clover, ladino clover, birdsfoot trefoil, and lespedeza. It is not suited to hay. On pasture and hayland, the limitations are slope, stoniness, droughtiness, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 180 board feet on north-facing slopes and 150 board feet on south-facing slopes. Stones on the surface limit woodland use and management. Major woodland management problems are the erosion hazard and the equipment limitation. The common trees are mixed hardwoods, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are slope, depth to bedrock, seepage, the thin layer of suitable soil material, and the difficulty in reclaiming the area. Slope limits use of the soil as sites for dwellings with or without basements, shallow excavations, and small commercial buildings, for local roads and streets, and for lawns and landscaping. Difficulty in reclaiming the area and the thin layer limit its use as roadfill and as daily cover for sanitary landfills. Depth to bedrock, seepage, and slope limit its use as sites for trench type sanitary landfills and sewage lagoons. Depth to bedrock and slope limit its use as sites for septic tank absorption fields.

This soil is in capability subclass VIs.

**2E—Ashe gravelly sandy loam, 25 to 60 percent slopes, very stony.** This is a moderately deep, somewhat excessively drained, steep or very steep soil on the sides of mountains and of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly long, and narrow or wide, or they are irregular in shape. They range from 4 to about 700 acres in size. Granite stones are scattered on about 3 percent of the surface.

Typically, the surface layer is dark yellowish brown gravelly sandy loam about 5 inches thick. The subsoil is yellowish brown gravelly sandy loam about 18 inches thick. Hard granite bedrock is at a depth of 23 inches.

Included with this soil in mapping are small areas of Edneytown and Edneyville soils and soils that are similar to the Ashe soil but that have more rock fragments in the subsoil, have more clay in the subsoil, or are deeper to bedrock. Also included are small areas of soils that have slopes of less than 25 percent or more than 60 percent, small gullied areas, small areas of soils that have gravel or cobbles on the surface, areas of soils that have no stones on the surface, and small areas of granite rock outcrops. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Very low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All of the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Slope and stones on the surface impede tillage.

This soil is poorly suited to pasture and hay plants, such as tall fescue, bermudagrass, white clover, ladino clover, birdsfoot trefoil, and lespedeza. The main limitations are slope, stoniness, droughtiness, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production. Because of slope and stones on the surface, pasture management practices, such as seeding, liming, fertilizing, and weed control, are very difficult to apply.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 180 board feet on north-facing slopes and 150 board feet on south-facing slopes. Slope and the stones on the surface limit woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and seedling mortality. The common trees are mixed hardwoods, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are slope, depth to bedrock, seepage, and the thin layer of suitable soil material. Slope limits use of the soil as sites for dwellings with or without basements, shallow excavations, and small commercial buildings, for local streets and roads, and for lawns and landscaping. Slope and the thin layer of suitable soil material limit use of the soil as roadfill and as daily cover for sanitary landfills. Depth to bedrock, seepage, and slope limit its use as sites for trench type sanitary landfills and sewage lagoons. Depth to bedrock and slope limit its use as sites for septic tank absorption fields.

This soil is in capability subclass VIIs.

**3C—Berks channery loam, 7 to 15 percent slopes.** This is a moderately deep, well drained, strongly sloping soil on ridgetops and sides of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly irregular in shape on the ridgetops and long, narrow, and winding on the sides of ridges. They range from 4 to about 25 acres in size.

Typically, the surface layer is very dark grayish brown channery loam about 1 inch thick. The subsoil is about 20 inches thick. It is yellowish brown channery loam to a depth of 11 inches and yellowish brown extremely channery loam to a depth of 21 inches. The substratum extends to a depth of 36 inches. It is brownish yellow and light brownish gray, fractured shale that crushes to extremely channery loam. Brownish yellow and light gray, hard, fractured shale is at a depth of 36 inches.

Included with this soil in mapping are small areas of Sequoia soils and soils that are similar to the Berks soil but that are shallower to bedrock or have more clay in the subsoil. Also included are small areas of soils that have slopes of 2 to 7 percent or 15 to 25 percent, small areas of severely eroded soils, and small areas of shale rock outcrops. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Low
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Extremely acid to strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage of this soil is used for pasture, a moderate acreage is woodland, and a very small acreage is used for cultivated crops.

This soil is poorly suited to cultivated crops, such as corn, corn silage, tobacco, and small grains. Erosion potential is medium, and is a management concern. The soil is droughty because of the high content of shale fragments throughout the soil profile and moderate depth to fractured shale bedrock. Shale fragments in the surface layer impede tillage. Incorporating organic material into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, grassed waterways, cover crops, and grasses and legumes in the cropping system help to maintain soil tilth, to reduce runoff, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, and lespedeza. The major limitations to pasture and hayland are the channery surface layer, droughtiness, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 280 board feet. The large amount of rock fragments in the soil limits woodland use and management. The major woodland management problem is seedling mortality. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infected trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are depth to bedrock, slope, seepage, and shale fragments. Slope limits use of the soil as sites for dwellings without basements, for small commercial buildings, and for local roads and streets. Slope and depth to bedrock limit its use as sites for dwellings with basements and for shallow excavations. Slope, seepage, and depth to bedrock limit its use as sites for sewage lagoons and trench type sanitary landfills. Slope and shale fragments limit its use as sites for daily cover for sanitary landfills. Shale fragments limit its use for lawns and landscaping. Depth to bedrock limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IVe.

**3D—Berks channery loam, 15 to 25 percent slopes.** This is a moderately deep, well drained, moderately steep soil on the sides of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly narrow, long, and winding. They range from 4 to about 30 acres in size.

Typically, the surface layer is very dark grayish brown channery loam about 1 inch thick. The subsoil is about 20 inches thick. It is yellowish brown channery loam to a depth of about 11 inches. It is yellowish brown extremely channery loam to a depth of about 21 inches. The substratum extends to a depth of 36 inches. It is brownish yellow and light brownish gray, fractured shale that crushes to extremely channery loam. Brownish yellow and light gray, hard, fractured shale is at a depth of 36 inches.

Included with this soil in mapping are small areas of Sequoia soils and soils that are similar to the Berks soil but that are shallower to bedrock or have more clay in the subsoil. Also included are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent, small gullied areas, small areas that are subject to severe flooding, and small areas of shale rock outcrops. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Extremely acid to strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A small acreage is used for pasture and hay.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high and is a management concern. The soil is droughty because of the high content of shale fragments throughout and depth to fractured shale bedrock. Shale fragments in the surface layer impede tillage.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, and lespedeza. The major limitations to pasture and hayland are the channery surface layer, droughtiness, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 280 board feet on north-facing slopes and 225 board feet on south-facing slopes. The large amount of rock fragments in the soil profile limits woodland use and management. Major woodland management problems are the equipment limitation and, especially on south-facing slopes, seedling mortality. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing insect- or disease-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, seepage, and shale fragments. Slope and depth to bedrock limit use of the soil as sites for septic tank absorption fields, shallow excavations, dwellings with or without basements, and small commercial buildings, and for local roads and streets. Slope, seepage, and depth to bedrock limit its use as sites for sewage lagoons and trench type sanitary landfills. Slope and shale fragments limit its use as daily cover for sanitary landfills and for lawns and landscaping.

This soil is in capability subclass VIe.

**3E—Berks channery loam, 25 to 60 percent slopes.** This is a moderately deep, well drained, steep and very steep soil on the sides of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding. They range from 4 to about 25 acres in size.

Typically, the surface layer is very dark grayish brown channery loam about 1 inch thick. The subsoil is about 20 inches thick. It is yellowish brown channery loam to a depth of 11 inches and yellowish brown extremely channery loam to a depth of 21 inches. The substratum extends to a depth of 36 inches. It is brownish yellow and light brownish gray, fractured shale that crushes to extremely channery loam. Brownish yellow and light gray, hard, fractured shale is at a depth of 36 inches.

Included with this soil in mapping are small areas of Sequoia soils and soils that are similar to the Berks soil but that are shallower to bedrock or have more clay in the subsoil. Also included are small areas of soils that have slopes of 15 to 25 percent or more than 60 percent, small gullied areas, small areas of severely eroded soils, and small areas of shale rock outcrops. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Extremely acid to strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. The main limitations are droughtiness, slope, very rapid surface runoff, and moderate soil depth. The high content of shale fragments in the surface layer impedes tillage.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, birdsfoot trefoil, and lespedeza. It is not suited to hay crops. The major limitations to pasture and hayland are slope, the channery surface layer, droughtiness, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 280 board feet on north-facing slopes and 225 board feet on south-facing slopes. The large amount of rock fragments in the soil profile and steep and very steep slopes limit woodland use and management. Major woodland management problems are equipment limitation, the erosion hazard, and seedling mortality, especially on south-facing slopes. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and white pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, seepage, and shale fragments. Slope and depth to bedrock are the main limitations to use of the soil as sites for septic tank absorption fields, shallow excavations, dwellings with or without basements, and small commercial buildings, and for local roads and streets. Slope, seepage, and depth to bedrock limit its use as sites for sewage lagoons and trench type sanitary landfills. Slope and shale fragments limit its use as daily cover for sanitary landfills and for lawns and landscaping. Slope limits its use as roadfill.

This soil is in capability subclass VIIe.

**4B—Braddock fine sandy loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on narrow to broad, convex ridgetops in the Blue Ridge Mountains. Slopes are smooth and complex. Areas of the soil are commonly elongated or irregular in shape. They range from 4 to about 100 acres in size.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 61 inches thick. It is yellowish red clay loam to a depth of 14 inches, dark red clay to a depth of 40 inches, and mottled, dark red clay to a depth of 72 inches.

Included with this soil in mapping are small areas of Hayesville and Thurmont soils and soils that are similar to the Braddock soil but that have a darker colored surface layer or have a subsoil that has a higher clay content. Also included are small areas of severely eroded soils, small areas of soils that have gravel, cobbles, or stones on the surface, and small areas of soils that have slopes of more than 7 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for cultivated crops. A moderate acreage is used for pasture and hay. The rest is woodland. This is a prime farmland soil.

This soil is well suited for cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, cover crops, terraces, contour stripcropping, grassed waterways, stubble mulching, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as orchardgrass, tall fescue, bermudagrass, midland bermudagrass, alfalfa, ladino clover, red clover, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet. The soil is easily managed for woodland. Major woodland management problems are the equipment limitation and plant competition. The common trees are mixed hardwoods, white pine, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are moderately permeable subsoil, seepage, clayey subsoil, slope, shrinking and swelling, and low strength. Seepage limits use of the soil as sites for sewage lagoons. Low strength limits its use for local roads and streets and as roadfill. Shrinking and swelling limits its use as sites for dwellings with or without basements. Slope and shrinking and swelling limit its use as sites for small commercial buildings. Seepage and clayey subsoil limit its use as sites for trench type sanitary landfills. The clay content of the subsoil makes the soil hard to pack if used as daily cover for trench type sanitary landfills. The clayey subsoil limits its use as sites for shallow excavations. Moderately permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**4C—Braddock fine sandy loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on the foot slopes of mountains, on ridgetops, and on the sides of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or they are irregular in shape. They range from 4 to about 80 acres in size.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 61 inches thick. It is yellowish red clay loam to a depth of 14 inches, dark red clay to a depth of 40 inches, and mottled, dark red clay to a depth of 72 inches.

Included with this soil in mapping are small areas of Edneytown, Hayesville, and Thurmont soils and soils that are similar to the Braddock soil but that have a darker colored surface layer or have a subsoil that has a higher clay content. Also included are small spots of severely eroded soils, small areas of soils that have gravel, cobbles, or stones on the surface, and small areas of soils that have slopes of less than 7 percent or more than 15 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for pasture or hay. A moderate acreage is used for cultivated crops. A small acreage is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, terraces, contour stripcropping, cover crops, grassed waterways, and grasses and legumes in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, ladino clover, red clover, alfalfa, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet. The soil is easily managed for woodland. Major woodland management problems are the equipment limitation and plant competition. The common tree species are mixed hardwoods, eastern white pine, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for many urban uses are slope, seepage, moderately permeable subsoil, clayey subsoil, low strength, and shrinking and swelling.

Seepage and clayey subsoil limit use of the soil as sites for sewage lagoons. Slope and clayey subsoil limit its use as sites for shallow excavations. Slope limits its use as sites for small commercial buildings and for lawns and landscaping. Slope and shrinking and swelling limit its use as sites for dwellings with or without basements. Slope and low strength limit its use for local roads and streets. Low strength limits its use as roadfill. Slope and moderately permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**4D—Braddock fine sandy loam, 15 to 25 percent slopes.** This is a very deep, well drained, moderately steep soil commonly on foot slopes of mountains and on the sides of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or they are irregular in shape. They range from 4 to about 20 acres in size.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 61 inches thick. It is yellowish red clay loam to a depth of 14 inches, dark red clay to a depth of 40 inches, and mottled, dark red clay to a depth of 72 inches.

Included with this soil in mapping are small areas of Edneytown, Hayesville, and Thurmont soils and soils that are similar to the Braddock soil but that have a darker colored surface layer or a subsoil that has a higher clay content. Also included are small areas of soils that have gravel, cobbles, and stones on the surface, small areas of severely eroded soils, small gullied areas, and small areas of soils that have slopes of less than 15 percent or more than 25 percent. The included soils make up about 15 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A moderate acreage is used for pasture and hay. A small acreage is used for cultivated crops.

This soil is poorly suited for cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, ladino clover, red clover, alfalfa, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet on north-facing slopes and 275 board feet on south-facing slopes. Moderately steep slopes limit woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and plant competition. The common trees are mixed hardwoods, eastern white pine, Virginia pine, loblolly pine, and shortleaf pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, seepage, clayey subsoil, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, shallow excavations, dwellings with or without basements, and small commercial buildings, for local roads and streets, and for lawns and landscaping. Seepage and slope limit its use as sites for sewage lagoons. The clayey subsoil and slope limit its use as daily cover for sanitary landfills. The clay content makes the soil hard to pack if used as cover. Seepage, clayey subsoil, and slope limit its use as sites for trench type sanitary landfills.

This soil is in capability subclass IVe.

**5B—Braddock cobbly fine sandy loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on narrow to broad, convex ridgetops in the Blue Ridge Mountains. Slopes are smooth. Areas of the soil are elongated or irregular in shape. They range from 4 to about 100 acres in size. Quartzite cobbles are common on the surface of this soil.

Typically, the surface layer is brown cobbly fine sandy loam about 11 inches thick. The subsoil is about 61 inches thick. It is yellowish red clay loam to a depth of 14 inches, dark red clay to a depth of 40 inches, and mottled, dark red clay to a depth of 72 inches.

Included with this soil in mapping are small areas of Sequoia and Laidig soils. Also included are small areas of soils that have slopes of 7 to 15 percent. The included soils make up about 15 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage of this soil is used for pasture or hay. A small acreage is used for cultivated crops. The rest is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, tobacco, and small grains. Erosion potential is medium, and is a management concern. The high content of rock fragments in the surface layer impedes tillage. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, terraces, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, and to control erosion.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, midland bermudagrass, white clover, ladino clover, red clover, and lespedeza. The major limitations to pasture and hayland are the cobbly surface layer, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet. The soil is easily managed for woodland. Major woodland management problems are plant competition and the equipment limitation. The common trees are mixed hardwoods, loblolly pine, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, moderately permeable subsoil, seepage, shrinking and swelling, clayey subsoil, low strength, and cobblestones. The low strength of the soil limits its use for local roads and streets. Low strength and cobblestones limit its use as roadfill. Cobblestones and shrinking and swelling limit its use as sites for dwellings with or without basements. Shrinking and swelling, slope, and cobblestones limit its use as sites for small commercial buildings. Cobblestones limit its use for lawns and landscaping. Seepage limits its use as sites for sewage lagoons. The clayey subsoil and seepage limit its use as sites for trench type sanitary landfills. The clayey subsoil and cobblestones limit its use as daily cover for sanitary landfills. The clay content makes the soil hard to pack if used as cover. The clayey subsoil and cobblestones limit its use as sites for shallow excavations. Cobblestones and moderately permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIs.

**5C—Braddock cobbly fine sandy loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on ridgetops, the sides of ridges, and foot slopes in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long and broad to narrow or irregular in shape. They range from 4 to about 50 acres in size. Quartzite cobbles are common on the surface.

Typically, the surface layer is brown cobbly fine sandy loam about 11 inches thick. The subsoil is about 61 inches thick. It is yellowish red clay loam to a depth of 14 inches, dark red clay to a depth of 40 inches, and mottled, dark red clay to a depth of 72 inches.

Included with this soil in mapping are small areas of Sequoia and Laidig soils. Also included are small areas of soils that have slopes of less than 7 percent or more than 15 percent, and small areas of severely eroded soils. The included soils make up about 15 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Rapid

*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage of this soil is used for pasture or hay. A small acreage is used for cultivated crops. About half of the acreage is woodland.

This soil is poorly suited to cultivated crops, such as corn, corn silage, tobacco, and small grains. Erosion potential is medium, and is a management concern. The high content of rock fragments in the surface layer impedes tillage. Tilth can be maintained or improved by incorporating organic matter into the soil and by plowing when the soil has the proper moisture content. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, terraces, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, and to control erosion.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are the cobbly surface layer, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet. The soil is easily managed for woodland. Major woodland management problems are plant competition and the equipment limitation. The common trees are mixed hardwoods, loblolly pine, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, moderately permeable subsoil, low strength, shrinking and swelling, seepage, clayey subsoil, and cobblestones on the surface. Slope limits use of the soil as sites for small commercial buildings. The clayey subsoil and seepage limit its use as sites for trench type sanitary landfills. Slope and low strength limit its use for local roads and streets. Slope, cobblestones, and shrinking and swelling limit its use as sites for dwellings with or without basements. Low strength and cobblestones limit its use as roadfill. Slope and cobblestones limit its use for lawns and landscaping. The clayey subsoil, cobblestones, and slope limit its use as sites for shallow excavations. Seepage and slope limit its use as sites for sewage lagoons. The clayey subsoil and cobblestones limit its use as daily cover for sanitary landfills. The clay content makes the soil hard to pack if used as cover. The moderately permeable subsoil, slope, and cobblestones limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IVs.

**6C—Braddock fine sandy loam, 7 to 15 percent slopes, very stony.** This is a very deep, well drained, strongly sloping soil on foot slopes of mountains, on ridgetops, and on the sides of ridges extending from the base of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long and narrow or broad, or irregular in shape. They range from 4 to about 70 acres in size. Granite stones are scattered over about 3 percent of the surface.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 61 inches thick. It is yellowish red clay loam to a depth of 14 inches, dark red clay to a depth of 40 inches, and mottled, dark red clay to a depth of 72 inches.

Included with this soil in mapping are small areas of Edneytown, Hayesville, and Thurmont soils and soils that are similar to the Braddock soil but that have a darker colored surface layer or a subsoil that has a higher clay content. Also included are small areas of soils that have a surface layer of loam, small areas of severely eroded soils, small gullied areas, small areas of soils that have gravel, cobbles, or boulders on the surface, and small areas of soils that have slopes of less than 7 percent or more than 15 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A moderate acreage is used for pasture. A small acreage is used as apple orchards.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high, and is a management concern. The granite stones on the surface impede or prohibit tillage.

This soil is moderately well suited to pasture plants, such as tall fescue, orchardgrass, bermudagrass, white clover, ladino clover, lespedeza, and birdsfoot trefoil. It is not suited to hay. The major limitations to pasture are granite stones on the surface, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. The granite stones on the surface limit seeding and mowing. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production. Clearing the surface layer of granite stones will facilitate management for pasture and hay.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet. The soil is easily managed for woodland. Major woodland management problems are the equipment limitation and plant competition. The common trees are mixed hardwoods, eastern white pine, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for many urban uses are slope, moderately permeable subsoil, seepage, clayey subsoil, large stones, shrinking and swelling, and low strength. Seepage and slope limit use of the soil as sites for sewage lagoons. Seepage and clayey subsoil limit its use as sites for trench type sanitary landfills. The clayey subsoil and large stones limit its use as daily cover for trench type sanitary landfills. The clayey subsoil, large stones, and slope limit its use as sites for shallow excavations. Slope, shrinking and swelling, and large stones limit its use as sites for dwellings with or without basements. Slope limits its use as sites for small commercial buildings. Slope and low strength limit its use as sites for local roads and streets. Low strength and large stones limit its use as roadfill. Slope and large stones limit its use for lawns and landscaping. The moderately permeable subsoil, slope, and large stones limit its use as sites for septic tank absorption fields.

This soil is in capability subclass VIs.

**6D—Braddock fine sandy loam, 15 to 25 percent slopes, very stony.** This is a very deep, well drained, moderately steep soil on foot slopes of mountains, on ridgetops, and on the sides of ridges extending from the base of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from 4 to about 60 acres in size. Granite stones are scattered over about 3 percent of the surface.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 61 inches thick. It is yellowish red clay loam to a depth of 14 inches, dark red clay to a depth of 40 inches, and mottled, dark red clay to a depth of 72 inches.

Included with this soil in mapping are small areas of Edneytown, Hayesville, and Thurmont soils and areas of soils that are similar to the Braddock soil but that have a darker surface layer or a higher clay content in the subsoil. Also included are small areas of soils that have a surface layer of loam, small areas of severely eroded soils, small areas of gullied soils, small areas of soils that have gravel, cobbles, or boulders on the surface, and small areas of soils that have slopes of less than 15 percent or more than 25 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used as apple orchards or as pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is medium, and is a management concern. The granite stones on the surface impede or prohibit tillage.

This soil is moderately well suited to pasture plants, such as tall fescue, orchardgrass, bermudagrass, white clover, ladino clover, lespedeza, and birdsfoot trefoil. It is not suited to hay. The major limitations to pasture are the granite stones on the surface, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. The granite stones on the surface limit application of lime and fertilizer, seeding, and mowing. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production. Clearing the surface layer of granite stones will facilitate management for pasture and hay.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet on north-facing slopes and 275 board feet on south-facing slopes. Moderately steep slopes limit woodland use and management. Major woodland management problems are the equipment limitation and plant competition. The common trees are mixed hardwoods, eastern white pine, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for many urban uses are slope, seepage, clayey subsoil, low strength, and large stones. Seepage and slope limit use of the soil as sites for sewage lagoons. Seepage, slope, and clayey subsoil limit its use as sites for trench type sanitary landfills. The clayey subsoil and large stones limit its use as daily cover for trench type sanitary landfills. The clay content makes the soil hard to pack if used as cover. Slope limits its use as sites for septic tank absorption fields, shallow excavations, dwellings with or without basements, and small commercial buildings, for local roads and streets, and for lawns and landscaping. Low strength, large stones, and slope limit its use as roadfill.

This soil is in capability subclass VIs.

**7B—Cecil fine sandy loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on narrow to broad, convex rises on Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil commonly follow the tops of rises and are commonly irregular in shape. They range from 4 to about 300 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam about 4 inches thick. The subsoil is about 50 inches thick. It is yellowish red sandy clay loam to a depth of 9 inches, red clay to a depth of 42 inches, and red clay loam and many mica flakes to a depth of 56 inches. The substratum extends to a depth of 72 inches. It is saprolite of mica gneiss that crushes to red loam that has many mica flakes.

Included with this soil in mapping are small areas of Cullen, Madison, and Turbeville soils. Also included are small areas of soils that have slopes of 7 to 15 percent, small areas of severely eroded soils, and small areas of soils that have a surface layer of gravelly loam, gravelly fine sandy loam, or cobbly fine sandy loam. The included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for cultivated crops. A moderate acreage is used for pasture and hay (fig. 1). A moderate acreage is woodland. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, small grains, and dark tobacco. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage (fig. 2), stubble mulching, contour stripcropping, terraces, cover crops, grasses and legumes in the cropping system, and grassed waterways help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control soil erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as orchardgrass, tall fescue, midland bermudagrass, ladino clover, white clover, red clover, birdsfoot trefoil, lespedeza, and alfalfa (figs. 3 and 4). The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is very high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

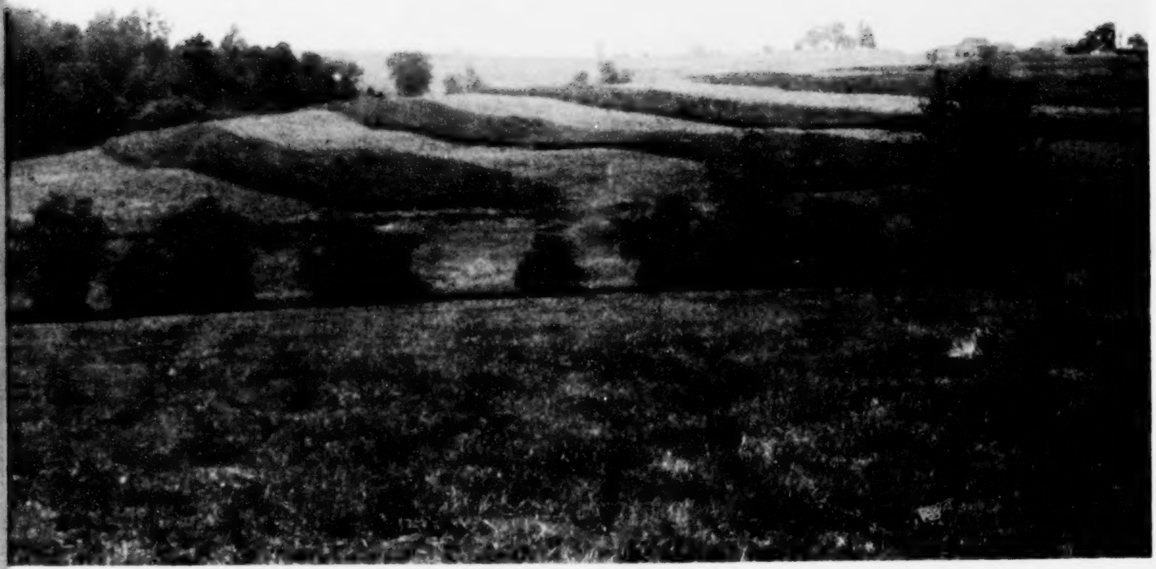


**Figure 1.—In the foreground, a pasture of tall fescue is on Cecil fine sandy loam, 2 to 7 percent slopes. In the middleground, stripcropping of corn and orchardgrass is on Cecil fine sandy loam, 7 to 15 percent slopes.**

The main limitations of this soil for most urban uses are moderately permeable subsoil, seepage, slope, clayey subsoil, and low strength. Seepage and slope limit use of the soil as sites for sewage lagoons. The clayey subsoil limits its use as sites for trench type sanitary landfills and shallow excavations. Low strength limits its use for local roads and streets and as roadfill. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. There are no major limitations to use of the soil as sites for dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. The moderately permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**7C—Cecil fine sandy loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on broad to narrow tops of rises, and on the sides of rises on Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding or are irregular in shape. They range from 4 to about 50 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam about 4 inches thick. The subsoil is about 50 inches thick. It is yellowish red sandy clay loam to a depth of 9 inches, red clay to a depth of 42 inches, and red clay loam and many mica flakes to a depth of 56 inches. The substratum extends to a depth of 72 inches. It is saprolite of mica gneiss that crushes to red loam that has many mica flakes.

Included with this soil in mapping are small areas of Cullen, Madison, and Turbeville soils. Also included are small areas of soils that have slopes of 2 to 7 percent or 15 to 25 percent, small areas of severely eroded soils, small gullied areas, and small areas of soils that have a surface layer of loam, gravelly loam, gravelly fine sandy loam, and cobbly fine sandy loam. The included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid

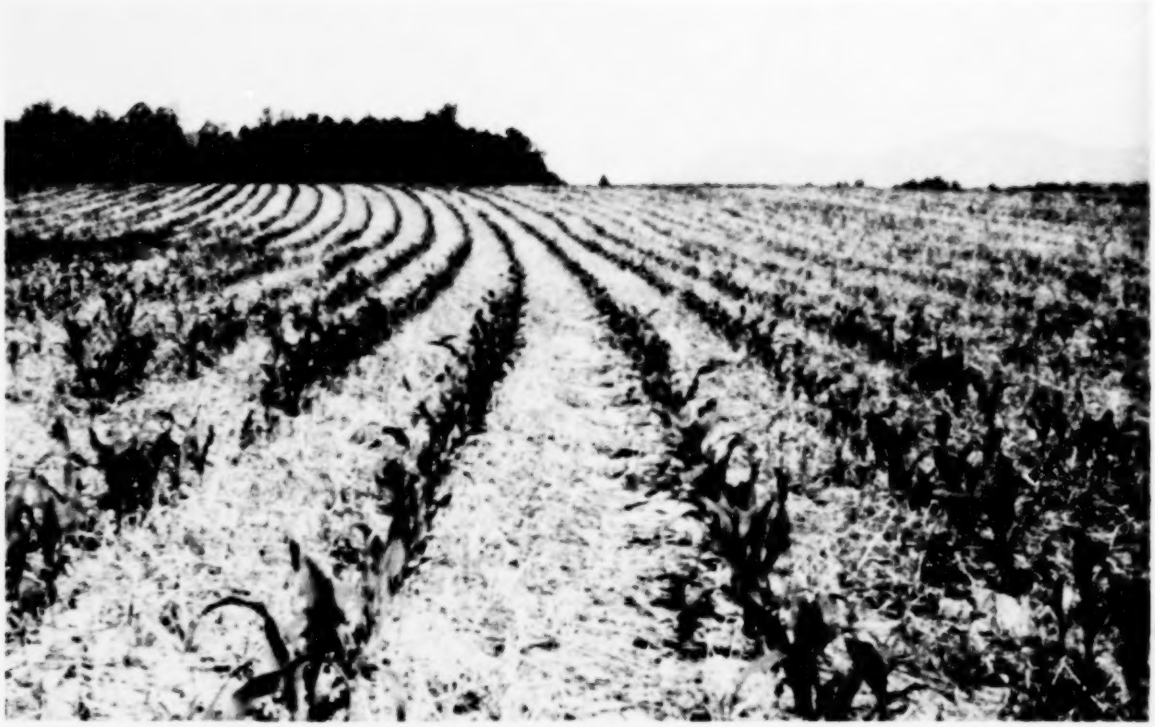


Figure 2.—No-till corn planted in small grain stubble on Cecil fine sandy loam, 2 to 7 percent slopes.

*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for pasture. A moderate acreage is used for cultivated crops. A moderate acreage is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, small grains, and dark tobacco. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, cover crops, grasses and legumes included in the cropping system, and grassed waterways help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control soil erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, midland bermudagrass, ladino clover, red clover, lespedeza, and alfalfa (fig. 5). The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is very high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-

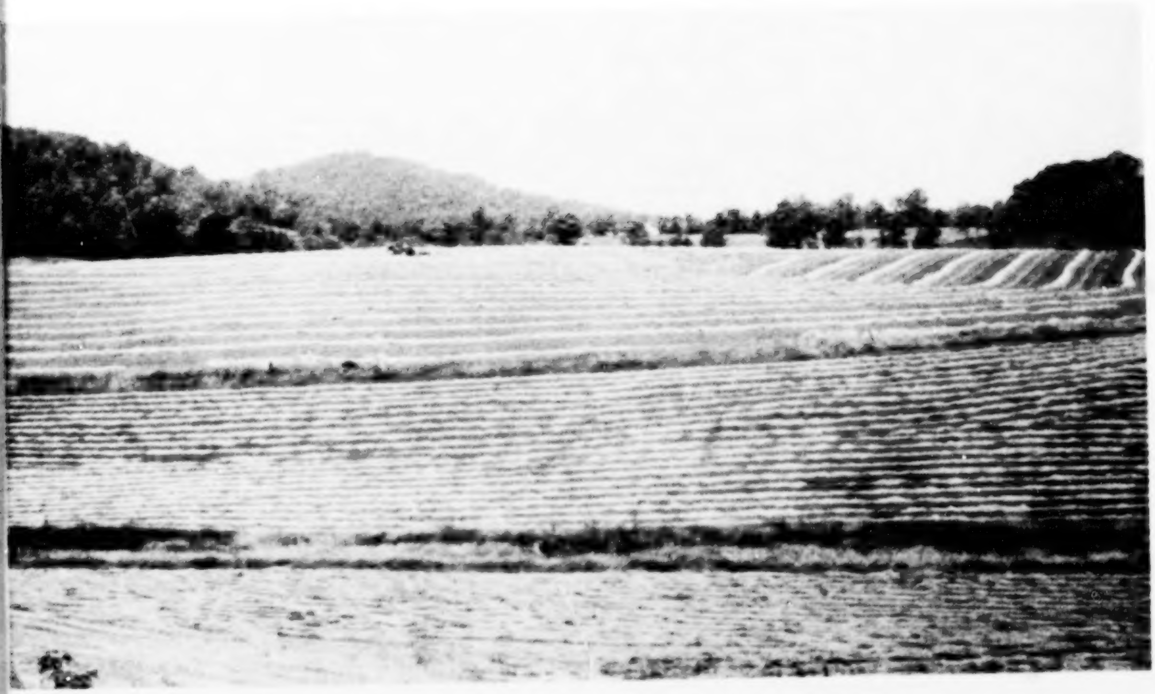


Figure 3.—Grass-legume hay on Cecil fine sandy loam, 2 to 7 percent slopes.

growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, moderately permeable subsoil, clayey subsoil, and low strength. Slope limits use of the soil as sites for sewage lagoons, dwellings with or without basements, and small commercial buildings. Slope and clayey subsoil limit its use as sites for trench type sanitary landfills and shallow excavations. The clayey subsoil and slope limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Slope and low strength limit its use for local roads and streets. Low strength limits its use as roadfill. The moderately permeable subsoil and slope limit its use as sites for septic tank absorption fields. There are no major limitations to its use for lawns and landscaping.

This soil is in capability subclass IIIe.

**8A—Chewacla loam, 0 to 2 percent slopes.** This is a very deep, somewhat poorly drained, nearly level soil on narrow to wide flood plains of streams and rivers mainly in the Piedmont. Slopes are smooth and commonly complex. The soil is subject to occasional flooding. Areas of the soil are in long, narrow, concave areas of the flood plain where in some areas water is standing or water-tolerant plants are growing. They range from 4 to about 50 acres in size.

Typically, the surface layer is reddish brown loam about 10 inches thick. The subsoil is about 31 inches thick. It is mottled, dark brown sandy loam to a depth of 16 inches, mottled, grayish brown sandy loam to a depth of 24 inches, mottled, strong brown sandy clay loam to a depth of 33 inches, and mottled, gray sandy clay loam to a depth of 41 inches. The substratum is gray loamy sand to a depth of 72 inches.

Included with this soil in mapping are small areas of Altavista, State, and Toccoa soils. In some higher parts of the landscape the soil is better drained. In some lower parts of the landscape the soil is more poorly drained. Also included are small areas of soils that have a surface layer of silt loam and areas of soils that have slopes of 2 to 7 percent. The included soils make up as much as 25 percent of some mapped areas.

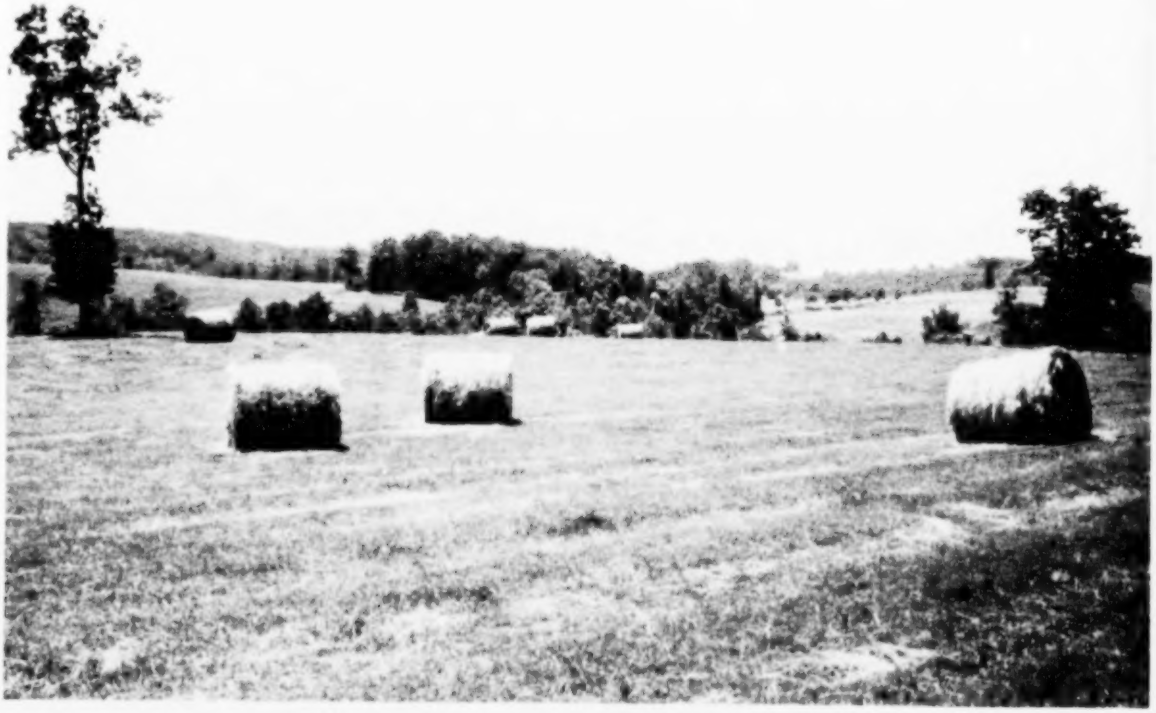


Figure 4.—Rolled bales of orchardgrass hay on Cecil fine sandy loam, 2 to 7 percent slopes.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Slow
*Erosion potential:* Low
*Tilth:* Good
*Organic matter content:* Low or moderate
*Natural fertility:* Low or medium
*Soil reaction:* Strongly acid or moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 6 to 18 inches
*Flooding:* Occasional and brief

A moderate acreage of this soil is used for pasture and hay. About half the acreage is woodland. A small acreage is used for cultivated crops. This is a prime farmland soil, where drained.

This soil is moderately well suited to cultivated crops, such as corn and corn silage. Erosion potential is low. In some years flooding and the seasonal high water table interfere with land preparation and planting in spring or harvesting crops in fall. In some years the seasonal high water table also restricts rooting depth. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintains or improves tilth. Crops respond to lime and fertilizer. If the soil is cultivated, tile drainage helps to reduce wetness. Conservation tillage, stubble mulching, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to increase the organic matter content, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, ladino clover, white clover, and red clover (fig. 6). The major limitations to pasture and hayland are the seasonal high water table, occasional flooding,

**Figure 5.—Beef cattle graze a pasture of tall fescue near a stand of mixed hardwoods and pine. The soil is Cecil fine sandy loam, 7 to 15 percent slopes.**

acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Restricted grazing mainly in winter and spring is needed because the soil is wet. Major pasture management concerns are establishing and maintaining a mixture to grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, restricted grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is very high. Estimated average annual production of wood per acre is 140 cubic feet. The seasonal high water table and flooding limit the soil for woodland use and management. The major woodland management problem is the equipment limitation. The common trees are loblolly pine, yellow-poplar, sycamore, and sweetgum. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production.

The main limitations of this soil for most urban uses are flooding, the seasonal high water table, and low strength. Flooding and the seasonal high water table limit use of the soil as sites for septic tank absorption fields, trench type sanitary landfills, sewage lagoons, dwellings with or without basements, and small commercial buildings. Low strength, the seasonal high water table, and flooding limit its use for local roads and streets. Low strength and the seasonal high water table limit its use as roadfill. The seasonal high water table limits its use as daily cover for sanitary landfills, as sites for shallow excavations, and for lawns and landscaping.

This soil is in capability subclass IIIw.

**9B—Cullen loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on narrow to broad convex rises on the Piedmont uplands. Slopes are smooth. Areas of the soil are commonly irregular in shape. They range from 4 to about 50 acres in size.

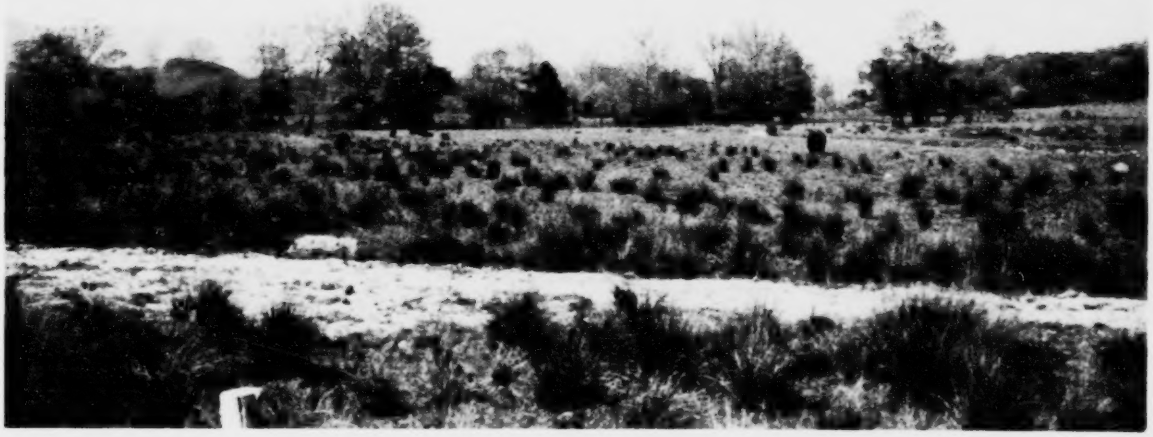


**Figure 6.—Beef cattle graze a pasture on Chewacla loam, 0 to 2 percent slopes. This soil is on the flood plain of a small creek and is subject to occasional flooding.**

Typically, the surface layer is reddish brown loam about 5 inches thick. The subsoil is about 57 inches thick. It is dark red clay to a depth of 53 inches and dark red clay loam, 45 percent of which is composed of strong brown weathered hornblende gneiss, to a depth of 62 inches. The substratum extends to a depth of 72 inches. It is saprolite of hornblende gneiss that crushes to clay loam.

Included with this soil in mapping are small areas of Cecil, Madison, Mecklenburg, and Turbeville soils. Also included are small areas of soils that have a surface layer of clay loam, fine sandy loam, silt loam, gravelly loam, gravelly fine sandy loam, or gravelly silt loam. Also included are small areas of soils that have slopes of 7 to 15 percent, small areas of severely eroded soils, and small areas of soils that have cobbles or stones on the surface. The included soils make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Strongly acid or moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for cultivated crops. A moderate acreage is used for pasture. A moderate acreage is woodland. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, terraces, grassed waterways, cover crops, grasses and legumes included in the cropping system, lime, and fertilizer help to increase productivity, to maintain soil tilth, to reduce runoff, to increase water infiltration, and to control erosion.

This soil is well suited to pasture and hay plants, such as orchardgrass, tall fescue, midland bermudagrass, bermudagrass, white clover, ladino clover, red clover, alfalfa, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are the moderately permeable subsoil, low strength, slope, clayey subsoil, seepage, and shrinking and swelling. Low strength limits use of the soil for local roads and streets and as roadfill. Shrinking and swelling limits its use as sites for dwellings with or without basements. Shrinking and swelling and slope limit its use as sites for small commercial buildings. There are no major limitations to its use for lawns and landscaping. The clayey subsoil limits its use as sites for shallow excavations and trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Slope and seepage limit its use as sites for sewage lagoons. The moderately permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**9C—Cullen loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on narrow to broad convex rises and on uplands in the Piedmont. Slopes are smooth and commonly complex. Areas of the soil are commonly irregular in shape on the rises and long, narrow, and winding on the sides of hills. They range from 4 to 25 acres in size.

Typically, the surface layer is reddish brown loam about 5 inches thick. The subsoil is about 57 inches thick. It is dark red clay to a depth of 53 inches and dark red clay loam, 45 percent of which is composed of strong brown weathered hornblende gneiss, to a depth of 62 inches. The substratum extends to a depth of 72 inches. It is saprolite of hornblende gneiss that crushes to clay loam.

Included with this soil in mapping are small areas of Cecil, Madison, Mecklenburg, and Turbeville soils. Also included are small areas of soils that have a surface layer of clay loam, fine sandy loam, silt loam, gravelly loam, gravelly fine sandy loam, and gravelly silt loam. Also included are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent, small gullied areas, small areas of severely eroded soils, and small areas of soils that have cobbles or stones on the surface. The included soils make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Strongly acid or moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for cultivated crops. A moderate acreage of this soil is used for pasture. A moderate acreage is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, grassed waterways, cover crops, grasses and legumes included in the cropping system, lime, and fertilizer help to increase productivity, to maintain soil tilth, to reduce runoff, to increase water infiltration, and to control erosion.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, midland bermudagrass, bermudagrass, white clover, ladino clover, red clover, alfalfa, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are moderately permeable subsoil, low strength, slope, clayey subsoil, and shrinking and swelling. Slope limits use of the soil as sites for sewage lagoons and small commercial buildings and for lawns and landscaping. Low strength limits its use for local roads and streets and as roadfill. Slope and shrinking and swelling limit its use as sites for dwellings with or without basements. Slope and the clayey subsoil limit its use as sites for shallow excavations. The clayey subsoil limits its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The moderately permeable subsoil and slope limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**9D—Cullen loam, 15 to 25 percent slopes.** This is a very deep, well drained, moderately steep soil on narrow sides of uplands above streams and drainageways in the Piedmont. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to 20 acres in size.

Typically, the surface layer is reddish brown loam about 5 inches thick. The subsoil is about 57 inches thick. It is dark red clay to a depth of 53 inches and dark red clay loam, 45 percent of which is composed of strong brown weathered hornblende gneiss, to a depth of 62 inches. The substratum extends to a depth of 72 inches. It is saprolite of hornblende gneiss that crushes to clay loam.

Included with this soil in mapping are small areas of Cecil, Madison, Mecklenburg, and Poindexter soils and soils that are similar to the Cullen soil but that have a thinner solum and are shallower to bedrock. Also included are small areas of soils that have a surface layer of clay loam, fine sandy loam, silt loam, gravelly fine sandy loam, gravelly loam, or gravelly silt loam. Also included are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent, small gullied areas, small areas of severely eroded soils, and small areas of soils that have cobbles or stones on the surface. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Strongly acid or moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A small acreage of this soil is used for cultivated crops. A moderate acreage is used for pasture. A large acreage is woodland.

This soil is poorly suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, grassed waterways, cover crops, grasses and legumes included in the cropping system, lime, and fertilizer help to increase productivity, to maintain soil tilth, to reduce runoff, to increase water infiltration, and to control erosion.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, midland bermudagrass, bermudagrass, white clover, ladino clover, red clover, alfalfa, and lespedeza. The major limitations to pasture and hayland are slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet on north-facing slopes and 93 cubic feet on south-facing slopes. Moderately steep slopes limit woodland use and management. Major woodland management problems are the erosion hazard and the equipment limitation. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, clayey subsoil, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Slope and clayey subsoil limit its use as sites for trench type sanitary landfills. Slope and clayey subsoil limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Slope and low strength limit its use for local roads and streets. Low strength limits its use as roadfill.

This soil is in capability subclass IVe.

**10D—Dekalb very channery sandy loam, 15 to 25 percent slopes, very stony.** This is a moderately deep, well drained, moderately steep soil on narrow convex ridgetops of and on the sides of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long and narrow or irregular in shape. They range from 4 to about 75 acres in size. Quartzite stones, flagstones, or rock outcrops are scattered on about 3 percent of the surface.

Typically, the surface layer is about 5 inches thick. In the uppermost 2 inches it is very dark grayish brown very channery sandy loam. Below that, it is dark yellowish brown extremely channery sandy loam. The subsoil is yellowish brown very channery sandy loam about 15 inches thick. The substratum is yellowish brown extremely channery sandy loam to a depth of about 25 inches. Hard, fractured sandstone bedrock is at a depth of 25 inches.

Included with this soil in mapping are small areas of soils that are similar to the Dekalb soil but that are deeper to bedrock, have fewer rock fragments throughout, and have more clay in the subsoil. Also included are areas of soils that are similar to the Dekalb soil but that are shallower to bedrock than the Dekalb soil or that have an argillic horizon in the subsoil. Also included are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Rapid
*Available water capacity:* Very low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Moderate
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. The high content of rock fragments in the surface layer prohibit tillage.

This soil is moderately well suited to pasture plants, such as tall fescue, birdsfoot trefoil, and lespedeza. The soil is not suited to hay because of stones on the surface. The major limitations to pasture are rock fragments on the surface, droughtiness, slope, very rapid runoff, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production. The stones on the surface impede application of such pasture management practices as seeding, liming, fertilizing, and weed control.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 210 board feet on north-facing slopes and 200 board feet on south-facing slopes. The large amount of rock fragments in the profile limits woodland use and management. Major woodland management problems are the equipment limitation and seedling mortality. The common trees are mixed hardwoods, eastern white pine, and Virginia pine. Selective cutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil to most urban uses are slope, depth to bedrock, seepage, small stones, and difficulty in reclaiming the area. Slope limits use of the soil as sites for dwellings without basements and small commercial buildings, and for local roads and streets. Slope, depth to bedrock, and seepage limit its use as sites for sewage lagoons and trench type sanitary landfills. Slope, small stones, and difficulty in reclaiming the area limit use of the soil as daily cover for sanitary landfills. Slope and depth to bedrock limit its use as sites for septic tank absorption fields, shallow excavations, and dwellings with basements. Difficulty in reclaiming the area limits use of this soil as roadfill. Slope and small stones limit its use for lawns and landscaping.

This soil is in capability subclass VIs.

**10E—Dekalb very channery sandy loam, 25 to 60 percent slopes, very stony.** This is a moderately deep, well drained, steep and very steep soil on the sides of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are irregular in shape or long and broad, and are dissected by drainageways. They range from about 10 to 500 acres in size. Quartzite stones, flagstones, or rock outcrops are scattered on about 3 percent of the surface.

Typically, the surface layer is about 5 inches thick. In the uppermost 2 inches it is very dark grayish brown very channery sandy loam. Below that it is dark yellowish brown extremely channery sandy loam. The subsoil is yellowish brown very channery sandy loam about 15 inches thick. The substratum is yellowish brown extremely channery sandy loam to a depth of about 25 inches. Hard, fractured sandstone bedrock is at a depth of 25 inches.

Included with this soil in mapping are small areas of soils that are similar to the Dekalb soil but that are deeper to bedrock, have fewer rock fragments throughout, and have more clay in the subsoil. Also included are areas of soils that are similar to the Dekalb soil but that are shallower to bedrock than the Dekalb soil or that have an argillic horizon in the subsoil. Also included are small areas of soils that have slopes of less than 25 percent or more than 60 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Rapid
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Moderate
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county because of slope, stones on the surface, acidity, low natural fertility, and droughtiness. Erosion potential is high. The high content of rock fragments in the surface layer impede tillage.

This soil is poorly suited to pasture plants, such as tall fescue, birdsfoot trefoil, and lespedeza. The soil is not suited to hay because of stones on the surface and slope. The major limitations to pasture are slope, droughtiness, rock fragments on the surface, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production. Slope and stones on the surface impede application of pasture management practices, such as seeding, liming, fertilizing, and weed control.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 210 board feet on north-facing slopes and 200 board feet on south-facing slopes. The large amount of coarse fragments in the profile limits woodland use and management. Major woodland management problems are the equipment limitation, seedling mortality, and the erosion hazard. The common trees are mixed hardwoods, eastern white pine, and Virginia pine. Selective cutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, depth to bedrock, seepage, small stones, and difficulty in reclaiming the area. Slope limits use of the soil as sites for dwellings without basements and small commercial buildings, and for local roads and streets. Slope, depth to bedrock, and seepage limit its use as sites for sewage lagoons and trench type sanitary landfills. Slope, small stones, and difficulty in reclaiming the area limit use of the soil as daily cover for sanitary landfills. Slope and depth to bedrock limit its use as sites for septic tank absorption fields, shallow excavations, and dwellings with basements. Difficulty in reclaiming the area and slope limit its use as roadfill. Slope and small stones limit its use for lawns and landscaping.

This soil is in capability subclass VIIs.

**11C—Edneytown loam, 7 to 15 percent slopes.** This is a deep, well drained, strongly sloping soil commonly on narrow, convex ridgetops and convex sides of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long and narrow or irregular in shape. They range from about 4 to 20 acres in size.

Typically, the surface layer is dark yellowish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is strong brown clay loam to a depth of 31 inches and strong brown sandy clay loam to a depth of 40 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Thurmont and Hayesville soils and soils that are similar to the Edneytown soil but that have more clay in the subsoil than the Edneytown soil or that are less than 60 inches deep to bedrock. Also included are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent, small areas of gullied soils, small areas of severely eroded soils, and small areas of soils that have gravel, cobbles, stones, or rock outcrops on the surface.

The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or medium
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A small acreage of this soil is used for cultivated crops. A moderate acreage is used for pasture or hay. The rest is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour stripcropping, terraces, cover crops, grassed waterways, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, white clover, ladino clover, red clover, and lespedeza. The major limitations to pasture and hay are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet. The soil is easily managed for woodland use and management. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Selective cutting, thinning stands for rapid growth, replanting with fast-growing species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are slope, seepage, sandiness, and cutbanks caving in. Slope limits use of the soil as sites for septic tank absorption fields, dwellings with or without basements, and small commercial buildings, for lawns and landscaping, and for local roads and streets. There are no limitations to its use as roadfill. Slope and seepage limit its use as sites for sewage lagoons. Seepage limits its use as sites for trench type sanitary landfills. Slope and sandiness limit its use as daily cover for sanitary landfills.

This soil is in capability subclass IIIe.

**11D—Edneytown loam, 15 to 25 percent slopes.** This is a deep, well drained, moderately steep soil commonly on the sides of ridges above streams and drainageways in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from about 4 to 25 acres in size.

Typically, the surface layer is dark yellowish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is strong brown clay loam to a depth of 31 inches and strong brown sandy clay loam to a depth of 40 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Ashe, Edneyville, and Hayesville soils and areas of soils that are similar to the Edneytown soil but that are less than 60 inches to bedrock. Also included are small areas of soils that have slopes of less than 15 percent or more than 25 percent, small gullied areas, small severely eroded spots, and small areas of soils that have gravel, cobbles, stones, and rock outcrops on the surface. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A small acreage of this soil is used for cultivated crops and pasture. The rest is woodland.

This soil is poorly suited to cultivated crops, such as corn, corn silage, and small grains. Erosion potential is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, grassed waterways, cover crops, contour stripcropping, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, white clover, ladino clover, red clover, and lespedeza. The major limitations to pasture and hayland are moderately steep slopes, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet on north-facing slopes and 200 board feet on south-facing slopes. Moderately steep slopes limit woodland use and management. Major woodland management problems are the erosion hazard, seedling mortality on south-facing slopes, and the equipment limitation. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Selective cutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing insect-infested or diseased trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, seepage, and cutbanks caving in. Slope limits use of the soil as sites for septic tank absorption fields, dwellings with or without basements, and small commercial buildings, for local roads and streets, and as roadfill. Slope also limits its use as sites for trench type sanitary landfills, as daily cover for sanitary landfills, and for lawns and landscaping. Slope and cutbanks caving in limit its use as sites for shallow excavations. Seepage and slope limit its use as sites for sewage lagoons.

This soil is in capability subclass IVe.

**11E—Edneytown loam, 25 to 60 percent slopes.** This is a deep, well drained, steep and very steep soil on the sides of ridges above streams and drainageways in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 30 acres in size.

Typically, the surface layer is dark yellowish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is strong brown clay loam to a depth of 31 inches and strong brown sandy clay loam to a depth of 40 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Ashe, Edneyville, and Hayesville soils and areas of soils that are similar to the Edneytown soil but that are less than 60 inches to bedrock. Also included are small areas of soils that have slopes of less than 25 percent or more than 60 percent, small gullied areas, small severely eroded areas, and small areas of soils that have gravel, cobbles, stones, and rock outcrops on the surface. The included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A small acreage of this soil is used for pasture. The rest is woodland.

This soil is not suited to cultivated crops commonly grown in the county because of steep and very steep slopes, acidity, low natural fertility, and droughtiness. Erosion potential is high.

This soil is moderately well suited to pasture plants, such as tall fescue, bermudagrass, birdsfoot trefoil, white clover, and lespedeza. It is not suited to hay because of slope. The major limitations to pasture are slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet on north-facing slopes and 200 board feet on south-facing slopes. Steep and very steep slopes limit woodland use and management. Major woodland management problems are the erosion hazard, seedling mortality on south-facing slopes, and the equipment limitation. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Selective cutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitation of this soil for most urban uses are slope, seepage, and cutbanks caving in. Slope limits use of the soil as sites for septic tank absorption fields, dwellings with or without basements, and small commercial buildings, for local roads and streets, as roadfill, and for lawns and landscaping. Slope also limits its use as sites for trench type sanitary landfills and as daily cover for sanitary landfills. Slope and seepage limit its use as sites for sewage lagoons. Cutbanks caving in and slope limit its use as sites for shallow excavations.

This soil is in capability subclass VIe.

**12C—Edneytown loam, 7 to 15 percent slopes, extremely stony.** This is a deep, well drained, strongly sloping soil on narrow mountain ridgetops, on narrow to broad foot slopes of mountains, and narrow ridgetops and sides of ridges above streams and drainageways in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long and narrow, or irregular in shape. They range from 4 to about 50 acres in size. Granite stones are scattered on about 10 percent of the surface.

Typically, the surface layer is extremely stony dark yellowish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is strong brown clay loam to a depth of 31 inches and sandy clay loam to a depth of 40 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Hayesville and Thurmont soils and soils that are similar to the Edneytown soil but that have more clay in the subsoil or are shallower to hard bedrock. Also included are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent and small areas of soils that have gravel, cobbles, boulders, and rock outcrops on the surface. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Poor
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A small acreage of this soil is used for pasture. The rest is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is medium. Granite stones scattered on the surface prevent tillage.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, white clover, ladino clover, and lespedeza. It is not suited to hay. The major limitations to pasture are granite stones scattered on the surface, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Granite stones on the surface impede application of pasture management practices, such as seeding, mowing, liming, or fertilizing. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet. Stones on the surface limit woodland use and management. The major woodland management problem is the equipment limitation. The common trees are mixed hardwoods, Virginia pine, eastern white pine, and shortleaf pine. Selective cutting, clearcutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses will help to control erosion.

The main limitations of this soil for many urban uses are slope, seepage, sandiness, cutbanks caving in, and large stones. Slope and large stones limit use of the soil as sites for septic tank absorption fields, dwellings with or without basements, and small commercial buildings, for local roads and streets, as roadfill, and for lawns and landscaping. Slope, seepage, and large stones limit its use as sites for sewage lagoons. Seepage and large stones limit its use as sites for trench type sanitary landfills. Slope, sandiness, and large stones limit its use as daily cover for sanitary landfills. Cutbanks caving in and large stones limit its use as sites for shallow excavations.

This soil is in capability subclass VIIs.

**12D—Edneytown loam, 15 to 25 percent slopes, extremely stony.** This is a deep, well drained, moderately steep soil commonly on narrow, convex mountain ridgetops and narrow to broad foot slopes of mountains or sides of ridges above streams and drainageways in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from 4 to about 70 acres in size. Granite stones are scattered on about 10 percent of the surface.

Typically, the surface layer is extremely stony dark yellowish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is strong brown clay loam to a depth of 31 inches and sandy clay loam to a depth of 40 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Ashe, Hayesville, and Thurmont soils and soils that are similar to the Edneytown soil but that have more clay in the subsoil or are shallower to hard bedrock than the Edneytown soil. Also included are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent, small gullied areas, and small areas of soils that have gravel, cobbles, boulders, or rock outcrops on the surface. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Granite stones scattered on the surface prohibit tillage.

This soil is poorly suited for pasture plants, such as tall fescue, bermudagrass, white clover, ladino clover, and lespedeza. It is not suited to hay. The major limitations to pasture are granite stones scattered on the surface, slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Granite stones on the surface impede application of pasture management practices, such as seeding, mowing, liming, and fertilizing. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet on north-facing slopes and 200 board feet on south-facing slopes. Stones on the surface limit woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and seedling mortality on south-facing slopes. The common trees are mixed hardwoods, Virginia pine, eastern white pine, shortleaf pine, and mixed hardwoods. Selective cutting, clearcutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses will help to control erosion.

The major limitations of this soil for most urban uses are slope, seepage, cutbanks caving in, and large stones. Slope and large stones limit use of the soil as sites for septic tank absorption fields, dwellings with or without basements, and small commercial buildings. They also limit its use for local roads and streets, as roadfill, for lawns and landscaping, as sites for trench type sanitary landfills, and as daily cover for sanitary landfills. Slope, seepage, and large stones limit its use as sites for sewage lagoons. Slope, cutbanks caving in, and large stones limit its use as sites for shallow excavations.

This soil is in capability subclass VIIs.

**12E—Edneytown loam, 25 to 60 percent slopes, extremely stony.** This is a deep, well drained, steep and very steep soil commonly on the sides of mountains and of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from about 4 to 500 acres in size. Granite stones are scattered on about 10 percent of the surface.

Typically, the surface layer is extremely stony dark yellowish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is strong brown clay loam to a depth of 31 inches and sandy clay loam to a depth of 40 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Ashe, Edneyville, and Hayesville soils and soils that are similar to the Edneytown soil but that is shallower to hard bedrock than the Edneytown soil. Also included are small areas of soils that have slopes of less than 25 percent or more than 60 percent and small areas of soils that have gravel, cobbles, boulders, or rock outcrops on the surface. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid

*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All of the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Slope and granite stones scattered on the surface prevent tillage.

This soil is not suited to the pasture and hay plants commonly grown in the county. The major limitations to pasture and hayland are slope, granite stones scattered on the surface, acidity, and low natural fertility. The soil is somewhat droughty. Slope and granite stones on the surface impede or virtually prohibit application of pasture management practices, such as seeding, mowing, liming, and fertilizing.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 cubic feet on north-facing slopes and 200 cubic feet on south-facing slopes. Stones on the surface limit woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are mixed hardwoods, Virginia pine, eastern white pine, and shortleaf pine. Selective cutting, clearcutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, seepage, cutbanks caving in, and large stones. Slope and large stones limit use of the soil as sites for septic tank absorption fields, dwellings with or without basements, and small commercial buildings. They also limit its use for local roads and streets, as roadfill, for lawns and landscaping, as sites for trench type sanitary landfills, and as daily cover for sanitary landfills. Slope, seepage, and large stones limit its use as sites for sewage lagoons. Slope, cutbanks caving in, and large stones limit its use as sites for shallow excavations.

This soil is in capability subclass VIIs.

**13D—Edneyville gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony.** This is a very deep, well drained, moderately steep soil on the sides of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long and narrow, or irregular in shape. They range from 4 to about 300 acres in size. Granite or granite gneiss stones and cobbles or granite rock outcrops are scattered on about 10 percent of the surface.

Typically, the surface layer is about 6 inches thick. In the uppermost 3 inches it is very dark grayish brown gravelly fine sandy loam. Below that, to a depth of 6 inches, it is brown gravelly fine sandv loam. The subsoil is about 35 inches thick. It is brown cobbly fine sandy loam to a depth of 10 inches, strong brown cobbly sandy loam to a depth of 27 inches, and yellowish brown cobbly sandy loam to a depth of 40 inches. The substratum extends to a depth of 61 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam. Hard, granite gneiss bedrock is at a depth of 61 inches.

Included with this soil in mapping are small areas of Ashe and Edneytown soils and soils that are similar to the Edneyville soil but that have more rock fragments in the subsoil or are shallower to bedrock than the Edneyville soil. Also included are small areas of soils that have slopes of less than 15 percent or more than 25 percent and areas of soils that have cobbles on the surface. These included soils make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All of the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Granite stones scattered on the surface prohibit tillage.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, white clover, birdsfoot trefoil, and lespedeza. It is not suited to hay. The major limitations to pasture are granite stones scattered on the surface, slope, droughtiness, acidity, and low natural fertility. Granite stones prevent application of pasture management practices, such as seeding, liming, fertilizing, and weed control.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 280 board feet on north-facing slopes and 250 board feet on south-facing slopes. Stones on the surface limit woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and seedling mortality on south-facing slopes. The common trees are mixed hardwoods, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are slope, depth to bedrock, large stones, and difficulty in reclaiming the area. Slope limits use of the soil as sites for septic tank absorption fields, dwellings with or without basements, shallow excavations, and small commercial buildings. It also limits its use for local roads and streets, as daily cover for sanitary landfills, and as sites for sewage lagoons. Depth to bedrock and slope limit its use as sites for trench type sanitary landfills. Slope and large stones limit its use for lawns and landscaping. Slope and difficulty in reclaiming the area limit use of the soil as roadfill.

This soil is in capability subclass VIIs.

**13E—Edneyville gravelly fine sandy loam, 25 to 60 percent slopes, extremely stony.** This is a deep, well drained, steep and very steep soil on the sides of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long and wide, or irregular in shape. They range from 20 to about 500 acres in size. Granite or granite gneiss stones and cobbles, and granite rock outcrops are scattered on about 10 percent of the surface.

Typically, the surface layer is about 6 inches thick. In the uppermost 3 inches it is very dark grayish brown gravelly fine sandy loam. Below that, to a depth of 6 inches, it is brown gravelly fine sandy loam. The subsoil is about 35 inches thick. It is brown cobbly fine sandy loam to a depth of 10 inches, strong brown cobbly sandy loam to a depth of 27 inches, and yellowish brown cobbly sandy loam to a depth of 40 inches. The substratum extends to a depth of 61 inches. It is multicolored, weathered granite gneiss that crushes to sandy loam. Hard, granite gneiss bedrock is at a depth of 61 inches.

Included with this soil in mapping are small areas of Ashe and Edneytown soils and soils that are similar to the Edneyville soil but that have more rock fragments in the subsoil or are shallower to bedrock than the Edneyville soil. Also included are small areas of soils that have slopes of less than 25 percent or more than 60 percent. The included soils make up 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low or moderate
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All of the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Granite stones scattered on the surface prevent tillage.

This soil is not suited to pasture and hay plants, such as tall fescue, bermudagrass, white clover, birdsfoot trefoil, and lespedeza. The major limitations to pasture are granite stones scattered on the surface, slope, droughtiness, acidity, and low natural fertility. Granite stones on the surface prevent application of pasture management practices, such as seeding, liming, fertilizing, and weed control.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 280 board feet on north-facing slopes and 250 board feet on south-facing slopes. Stones on the surface limit woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and seedling mortality on south-facing slopes. The common trees are mixed hardwoods, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are slope, large stones, and depth to bedrock. Slope limits use of the soil as sites for septic tank absorption fields, dwellings with or without basements, shallow excavations, and small commercial buildings. Slope limits its use for local roads and streets, as roadfill, as daily cover for sanitary landfills, and as sites for sewage lagoons. Depth to bedrock and slope limit its use as sites for trench type sanitary landfills. Slope and large stones limit its use for lawns and landscaping.

This soil is in capability subclass VIIs.

**14C—Grover fine sandy loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on rises and side slopes of Piedmont uplands. Slopes are smooth and commonly complex.

Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 20 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam to a depth of about 9 inches. The subsoil, to a depth of about 28 inches, is yellowish red sandy clay loam that has common or many flakes of mica. It is, to a depth of about 36 inches, reddish brown sandy loam that has many flakes of mica. The substratum extends to a depth of about 72 inches. It is multicolored saprolite of mica schist and mica gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Cecil and Madison soils and soils that are similar to the Grover soil but that have more clay in the subsoil or are shallower to bedrock than the Grover soil. Also included are small areas of soils that have a surface layer of gravelly loam or gravelly fine sandy loam and small areas of soils that have slopes of less than 7 percent or more than 15 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have gravel, cobbles, and stones on the surface. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for pasture. A very small acreage is used for cultivated crops.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, stubble mulching, contour tillage, conservation tillage, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, midland bermudagrass, bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. There are no major woodland management problems. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, the thin layer of suitable soil material, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, trench type sanitary landfills, daily cover for sanitary landfills, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Slope and low strength limit its use for local roads and streets. Slope, low strength, and the thin layer of suitable soil material limit use of the soil as roadfill.

This soil is in capability subclass IIIe.

**14D—Grover fine sandy loam, 15 to 25 percent slopes.** This is a very deep, well drained, moderately steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to more than 20 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam to a depth of about 9 inches. The subsoil, to a depth of about 28 inches, is yellowish red sandy clay loam that has common or many flakes of mica. It is, to a depth of about 36 inches, reddish brown sandy loam that has many flakes of mica. The substratum extends to a depth of about 72 inches. It is multicolored saprolite of mica schist and mica gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Madison, Sweetapple, and Wateree soils and soils that are similar to the Grover soil but that are shallower to bedrock than the Grover soil. Also included are small areas of soils that have a surface layer of gravelly loam or gravelly fine sandy loam and small areas of soils that have slopes of 7 to 15 percent or more than 25 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have cobbles or stones on the surface. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for pasture. A very small acreage is used for cultivated crops.

This soil is poorly suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, stubble mulching, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to control soil erosion, to increase water infiltration, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, midland bermudagrass, bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet on north-facing slopes and 90 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and seedling mortality on south-facing slopes. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, low strength, and the thin layer of suitable soil material. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, trench type sanitary landfills, and daily cover for sanitary landfills. Slope also limits its use as sites for shallow excavations, dwellings with or without basements, and small commercial buildings, for local roads and streets, and for lawns and landscaping. Slope, low strength, and the thin layer of suitable soil material limit its use as roadfill.

This soil is in capability subclass IVe.

**14E—Grover fine sandy loam, 25 to 40 percent slopes.** This is a very deep, well drained, steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 15 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam to a depth of about 9 inches. The subsoil, to a depth of about 28 inches, is yellowish red sandy clay loam that has common or many flakes of mica. It is, to a depth of about 36 inches, reddish brown sandy loam that has many flakes of mica. The substratum extends to a depth of about 72 inches. It is multicolored saprolite of mica schist and mica gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Madison, Sweetapple, and Wateree soils and soils that are similar to the Grover soil but that are shallower to bedrock than the Grover soil. Also included are small areas of soils that have a surface layer of gravelly loam or gravelly fine sandy loam. Also included are small areas of soils that have slopes of 15 to 25 percent or more than 40 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have rock outcrops, cobbles, and stones on the surface. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches

*Flooding:* None

All of the acreage of this soil is woodland.

Because of slope, this soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high.

This soil is moderately well suited to pasture plants, such as tall fescue, bermudagrass, white clover, birdsfoot trefoil, and lespedeza. It is not suited to hay because of slope. The major limitation to pasture is slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet on north-facing slopes and 90 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and seedling mortality on south-facing slopes. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitation of this soil for most urban uses is slope. Slope limits use of the soil as sites for sewage lagoons, trench type sanitary landfills, daily cover for sanitary landfills, shallow excavations, and dwellings with or without basements. Slope limits its use as sites for small commercial buildings, for local roads and streets, for lawns and landscaping, as roadfill, and as sites for septic tank absorption fields.

This soil is in capability subclass VIe.

**15C—Gunstock channery loam, 7 to 15 percent slopes.** This is a moderately deep, well drained, strongly sloping soil on narrow ridgetops and on ridgetops of finger ridges at the base of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are generally long and narrow, or irregular in shape. They range from 4 to about 60 acres in size. Phyllite channers, quartzite channers, and quartzite flagstones are commonly on the surface.

Typically, the surface layer is yellowish brown channery loam about 8 inches thick. The subsoil is about 26 inches thick. It is brown clay loam to a depth of 11 inches, strong brown clay loam to a depth of 23 inches, and yellowish red clay loam to a depth of 34 inches. The substratum extends to a depth of about 47 inches. It is multicolored, soft, weathered phyllite that crushes to loam. Hard, multicolored, fractured phyllite bedrock is at a depth of 47 inches.

Included with this soil in mapping are small areas of Dekalb soils and soils that are similar to the Gunstock soil but that have more clay in the subsoil than typical for the Gunstock soil. Also included are small areas of soils that have slopes of less than 7 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Low
*Surface runoff:* Rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A very small acreage is used for pasture or hay.

This soil is poorly suited to cultivated crops, such as corn, corn silage, and small grains. Erosion potential is high, and is a management concern. The soil is droughty because of depth to soft bedrock and rock fragments in the surface layer. The high content of rock fragments in the surface layer impedes tillage. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations of this soil to pasture and hayland are droughtiness, rock fragments on the surface, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet. Restricted rooting depth because of soft bedrock limits woodland use and management. The major woodland management problem is the windthrow hazard. The common trees are mixed hardwoods, shortleaf pine, pitch pine, and Virginia pine. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, depth to bedrock, shrinking and swelling, large stones, and low strength. Slope and depth to bedrock limit use of the soil as sites for sewage lagoons. Depth to bedrock and large stones limit its use as daily cover for sanitary landfills. Depth to bedrock limits its use as sites for septic tank absorption fields and trench type sanitary landfills. Slope, large stones, and depth to bedrock limit its use as sites for shallow excavations. Shrinking and swelling, slope, and large stones limit its use as sites for dwellings without basements. Depth to bedrock, slope, and shrinking and swelling limit its use as sites for dwellings with basements. Slope limits its use as sites for small commercial buildings. Shrinking and swelling, low strength, and slope limit its use for local roads and streets. Depth to bedrock and shrinking and swelling limit its use as roadfill. Large stones limit its use for lawns and landscaping.

This soil is in capability subclass IVe.

**15D—Gunstock channery loam, 15 to 25 percent slopes.** This is a moderately deep, well drained, moderately steep soil on narrow mountain ridgetops and on sides of finger ridges at the base of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 25 acres in size. Phyllite channers, quartzite channers, and quartzite flagstones are commonly on the surface.

Typically, the surface layer is yellowish brown channery loam about 8 inches thick. The subsoil is about 26 inches thick. It is brown clay loam to a depth of 11 inches, strong brown clay loam to a depth of 23 inches, and yellowish red clay loam to a depth of 34 inches. The substratum extends to a depth of 47 inches. It is multicolored, soft, weathered phyllite that crushes to loam. Hard, multicolored, fractured phyllite bedrock is at a depth of 47 inches.

Included with this soil in mapping are small areas of Dekalb soils and soils that are similar to the Gunstock soil but that have more rock fragments in the subsoil or more clay in the subsoil than Gunstock soil. Also included are small areas of soils that have slopes of less than 15 percent or more than 25 percent and small areas of soils that have quartzite rock outcrops on the surface. These included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A very small acreage is used for pasture or hay.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. The soil is droughty because of depth to soft bedrock and rock fragments in the surface layer. The high content of rock fragments in the surface layer impedes tillage.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, birdsfoot trefoil, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are droughtiness, rock fragments on the surface, slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet on north-facing slopes and 200 board feet on south-facing slopes. Restricted rooting depth because of soft bedrock limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, seedling mortality on south-facing slopes, and the windthrow hazard. The common trees are mixed hardwoods, eastern white pine, pitch pine, and Virginia pine. Selective cutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, depth to bedrock, large stones, and shrinking and swelling. Slope limits use of the soil as sites for shallow excavations, dwellings without basements, and small commercial buildings, and for local roads and streets. Depth to bedrock, large stones, and slope limit its use as daily cover for sanitary landfills. Depth to bedrock, shrinking and swelling, and slope limit its use as roadfill and as sites for dwellings with basements. Large stones and slope limit its use for lawns and landscaping. Depth to bedrock and slope limit its use as sites for sewage lagoons, trench type sanitary landfills, and septic tank absorption fields.

This soil is in capability subclass VIe.

**15E—Gunstock channery loam, 25 to 45 percent slopes.** This is a moderately deep, well drained, steep and very steep soil on sides of mountain ridges and on sides of finger ridges at the base of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow to broad, and winding. They range from 4 to about 200 acres in size. Phyllite channers, quartzite channers, and quartzite flagstones are commonly on the surface.

Typically, the surface layer is yellowish brown channery loam about 8 inches thick. The subsoil is about 26 inches thick. It is brown clay loam to a depth of 11 inches, strong brown clay loam to a depth of 23 inches, and yellowish red clay loam to a depth of 34 inches. The substratum extends to a depth of about 47 inches. It is multicolored, soft, weathered phyllite that crushes to loam. Hard, multicolored, fractured phyllite bedrock is at a depth of 47 inches.

Included with this soil in mapping are small areas of Dekalb soils and soils that are similar to the Gunstock soil but that have more phyllite fragments in the subsoil or are shallower to hard bedrock than the Gunstock soil. Also included are small areas of soils that have slopes of less than 25 percent or more than 45 percent and small areas of soils that have quartzite rock outcrops on the surface. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

All of the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high.

This soil is poorly suited to pasture plants, such as tall fescue, birdsfoot trefoil, white clover, and lespedeza. It is not suited to hay because of slopes. The major limitations to pasture are slope, droughtiness, rock fragments on the surface, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderate. Estimated average annual production of wood per acre is 250 board feet on north-facing slopes and 200 board feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the windthrow hazard, seedling mortality on south-facing slopes, and the equipment limitation. The common trees are mixed hardwoods, eastern white pine, pitch pine, and Virginia pine. Selective cutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, depth to bedrock, and large stones. Slope limits use of the soil as sites for shallow excavation, dwellings with or without basements, and small commercial buildings, for local roads and streets, and as roadfill. Depth to bedrock, large stones, and slope limit its use as daily cover for sanitary landfills. Slope and large stones limit its use for lawns and landscaping. Depth to bedrock and slope limit its use as sites for sewage lagoons, trench type sanitary landfills, and septic tank absorption fields.

This soil is in capability subclass VIIe.

**16B—Hayesville loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on convex ridgetops in the Blue Ridge Mountains. Slopes are smooth. Areas of the soil are commonly irregular in shape. They range from 4 to more than 300 acres in size.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is about 45 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 40 inches, and red clay loam to a depth of 51 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to loam.

Included with this soil in mapping are small areas of Braddock, Edneytown, and Thurmont soils and soils that are similar to the Hayesville soil but that are dominantly dark red clay in the subsoil or that are shallower to bedrock than the Hayesville soil. Also included in mapping are small areas of soils that have slopes of 7 to 15 percent, small areas of severely eroded soils, and small areas of soils that have gravel, cobbles, stones, or rock outcrops on the surface. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for pasture and hay. A moderate acreage is woodland. A moderate acreage is used for cultivated crops. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, terraces, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, red clover, alfalfa, ladino clover, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet. The soil is easily managed for woodland. The common trees are mixed hardwoods, loblolly pine, shortleaf pine, Virginia pine, and eastern white pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, moderately permeable subsoil, clayey subsoil, low strength, and seepage. The clayey subsoil limits use of the soil as sites for shallow excavations. The clayey subsoil and seepage limit its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Low strength limits its use for local roads and streets. Slope limits its use as sites for small commercial buildings. The limitations of the soil are slight on sites for dwellings with or without basements, for lawns and landscaping, and as roadfill. The moderately permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**16C—Hayesville loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on convex ridgetops, sides of ridges, and foot slopes of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from 4 to about 200 acres in size.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is about 45 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 40 inches, and red clay loam to a depth of 51 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to loam.

Included with this soil in mapping are small areas of Braddock, Edneytown, and Thurmont soils and soils that are similar to the Hayesville soil but that are dominantly dark red clay in the subsoil or that are shallower to bedrock than the Hayesville soil. Also included in mapping are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have gravel, cobbles, stones, or rock outcrops on the surface. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is used for pasture and hay (fig. 7). A moderate acreage is used for cultivated crops. A moderate acreage is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, red clover, ladino clover, alfalfa, and lespedeza. The major limitations to pasture and hay are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity of this soil for northern red oak is moderately high. Estimated average annual production of wood per acre of 290 board feet. The soil is easily managed for woodland. The common trees are mixed hardwoods, loblolly pine, shortleaf pine, Virginia pine, and eastern white pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on

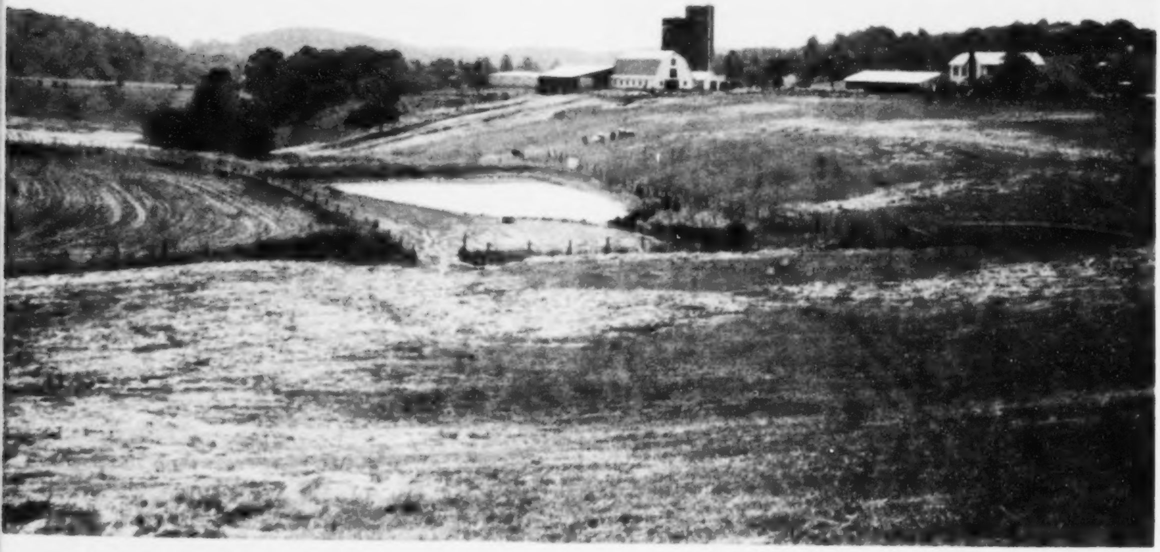


**Figure 7.—In the foreground and on the ridgetops, right middleground, a pasture of tall fescue and a hayfield are on Hayesville loam, 7 to 15 percent slopes. On the sides of ridges is Hayesville loam, 15 to 25 percent slopes.**

the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, moderately permeable subsoil, low strength, seepage, and clayey subsoil. Slope limits use of the soil as sites for dwellings with or without basements, and small commercial buildings, for lawns and landscaping, and as sites for sewage lagoons. Slope and clayey subsoil limit its use as sites for shallow excavations. Seepage and clayey subsoil limit its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Slope and low strength limit its use for local roads and streets. Slope and moderately permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**16D—Hayesville loam, 15 to 25 percent slopes.** This is a very deep, well drained, moderately steep soil on the sides of ridges and foot slopes of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are narrow, long, and winding, or irregular in shape. They range from 4 to about 40 acres in size.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is about 45 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 40 inches, and red clay loam to a depth of 51 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to loam.

Included with this soil in mapping are small areas of Braddock, Edneytown, and Thurmont soils and soils that are similar to the Hayesville soil but that are dominantly dark red clay in the subsoil, have less clay in the subsoil or a thinner solum, or are shallower to bedrock than the Hayesville soil. Also included in mapping are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent and small gullied areas. Also included are small areas of severely eroded soils and small areas of soils that have gravel, cobbles, stones, or rock outcrops on the surface. The included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A moderate acreage is used for pasture or hay. A very small acreage of this soil is used for cultivated crops.

This soil is poorly suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to applications of lime and fertilizer. If the soil is cultivated, conservation tillage, contour stripcropping, contour tillage, grassed waterways, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, midland bermudagrass, bermudagrass, alfalfa, white clover, red clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 290 board feet on north-facing slopes and 250 board feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are mixed hardwoods, loblolly pine, shortleaf pine, Virginia pine, and eastern white pine. Selective cutting, clearcutting, thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, seepage, and clayey subsoil. Slope limits use of the soil as sites for septic tank absorption fields, dwellings with or without basements, small commercial buildings, and shallow excavations. Slope also limits its use for local roads and streets, as roadfill, for lawns and landscaping, and as sites for sewage lagoons. The clayey subsoil and slope limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Seepage, clayey subsoil, and slope limit its use as sites for trench type sanitary landfills.

This soil is in capability subclass IVe.

**16E—Hayesville loam, 25 to 45 percent slopes.** This is a very deep, well drained, steep soil on the sides of ridges and on lower mountain slopes in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are narrow, long, and winding, or irregular in shape. They range from 3 to about 50 acres in size.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is about 45 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 40 inches, and red clay loam to a depth of 51 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to loam.

Included with this soil in mapping are small areas of Ashe, Edneytown, or Edneyville soils and soils that are similar to the Hayesville soil but that have a thinner solum depth, are shallower to bedrock, or have less clay in the subsoil than the Hayesville soil. Also included in mapping are small areas of soils that have slopes of less than 25 percent or more than 45 percent. Also included are small areas of soils that have cobbles, stones, or rock outcrops on the surface, small gullied areas, and small areas of severely eroded soils. The included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for pasture.

Because of slope, this soil is not suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is high.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, midland bermudagrass, bermudagrass, birdsfoot trefoil, white clover, ladino clover, and lespedeza. It is not suited to hay because of slope. The major limitations to pasture are slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 290 board feet on north-facing slopes and 250 board feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are mixed hardwoods, shortleaf pine, and Virginia pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, seepage, and clayey subsoil. Slope limits use of the soil as sites for septic tank absorption fields, dwellings with or without basements, and small commercial buildings. Slope also limits its use for lawns and landscaping, for local roads and streets, as roadfill, and as sites for shallow excavations and sewage lagoons. Slope, seepage, and clayey subsoil limit its use as sites for trench type sanitary landfills. Slope and clayey subsoil limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack.

This soil is in capability subclass VIe.

**17C—Hayesville loam, 7 to 15 percent slopes, very stony.** This is a very deep, well drained, strongly sloping soil on the foot slopes of mountains and on convex ridgetops and sides of ridges in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from 4 to about 150 acres in size. Granite stones are scattered on about 3 percent of the surface.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is about 45 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 40 inches, and red clay loam to a depth of 51 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss that crushes to loam.

Included with this soil in mapping are small areas of Braddock, Edneytown, and Thurmont soils and soils that are similar to the Hayesville soil but that are dominantly dark red clay in the subsoil or are shallower to bedrock than the Hayesville soil. Also included in mapping are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have gravel, cobbles, or rock outcrops on the surface. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Granite stones on the surface impede or prohibit tillage.

This soil is moderately well suited to pasture plants, such as tall fescue, bermudagrass, birdsfoot trefoil, white clover, ladino clover, and lespedeza. The soil is not suited to hay because of granite stones on the surface. The major limitations to pasture are granite stones on the surface, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Granite stones on the surface limit seeding and mowing the pastures. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 290 board feet. The soil is easily managed for woodland. The major woodland management problem is plant competition. The common trees are mixed hardwoods, shortleaf pine, loblolly pine, and Virginia pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, moderately permeable subsoil, clayey subsoil, seepage, low strength, and large stones. Slope limits use of the soil as sites for sewage lagoons, dwellings with or without basements, and small commercial buildings. Seepage and the clayey subsoil limit use of the soil as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The clayey subsoil and slope limit its use as sites for shallow excavations. Large stones and slope limit its use for lawns and landscaping. Low strength limits its use for local roads and streets and as roadfill. Slope and moderately permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass VIs.

**17D—Hayesville loam, 15 to 25 percent slopes, very stony.** This is a very deep, well drained, moderately steep soil on foot slopes of mountains and on sides of ridges in the Blue Ridge Mountains. Slopes are smooth and generally complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from 4 to about 50 acres in size. Granite stones are scattered on about 3 percent of the surface.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is about 45 inches thick. It is yellowish red clay loam to a depth of about 9 inches, red clay to a depth of about 40 inches, and red clay loam to a depth of 51 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss saprolite that crushes to loam.

Included with this soil in mapping are small areas of Braddock, Edneytown, and Thurmont soils and soils that are similar to the Hayesville soil but that have a dominantly dark red clay subsoil or that have less clay in the subsoil or are shallower to bedrock than the Hayesville soil. Also included in mapping are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent, small gullied areas, small areas of severely eroded soils, and small areas of soils that have gravel, cobbles, or rock outcrops on the surface. The included areas make up 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for pasture (fig. 8).

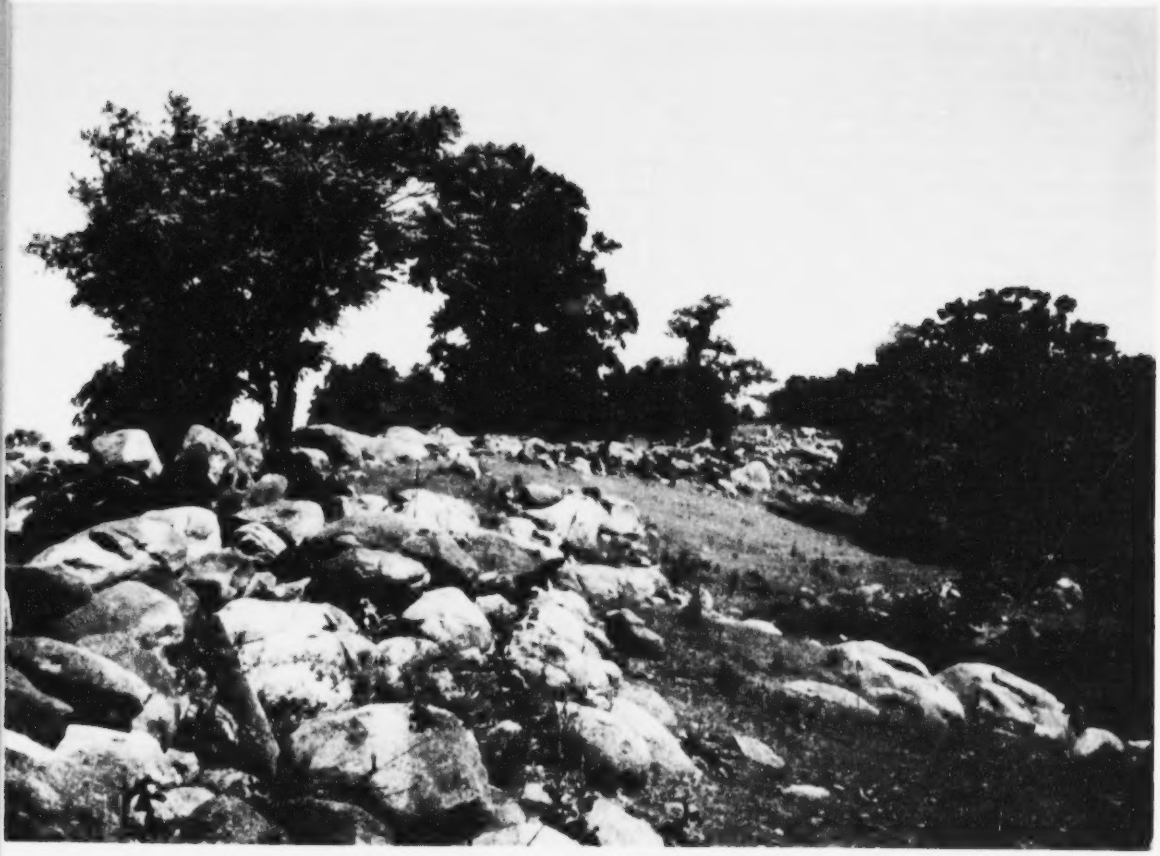


Figure 8.—Pasture on Hayesville loam, 15 to 25 percent slopes, very stony.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Granite stones on the surface impede or prohibit tillage.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, birdsfoot trefoil, white clover, ladino clover, and lespedeza. This soil is not suited to hay because of granite stones on the surface. The major limitations to pasture are granite stones on the surface, slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Slope and granite stones on the surface limit seeding and mowing the pastures. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 290 board feet on north-facing slopes and 250 board feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, plant competition, and, on south-facing slopes, seedling mortality. The common trees are mixed hardwoods, shortleaf pine, Virginia pine, and eastern white pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, seepage, clayey subsoil, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Slope, seepage, and clayey subsoil limit its use as sites for trench type sanitary landfills. Slope and clayey subsoil limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Slope and low strength limit its use for local roads and streets. Low strength limits its use as roadfill.

This soil is in capability subclass VIs.

**17E—Hayesville loam, 25 to 45 percent slopes, very stony.** This is a very deep, well drained, steep soil on lower slopes of mountains and on sides of ridges in the Blue Ridge Mountains. Slopes are smooth and generally complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from 4 to about 40 acres in size. Granite stones are scattered on about 3 percent of the surface.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is about 45 inches thick. It is yellowish red clay loam to a depth of about 9 inches, red clay to a depth of about 40 inches, and red clay loam to a depth of 51 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered granite gneiss saprolite that crushes to loam.

Included with this soil in mapping are small areas of Edneytown soils and soils that are similar to the Hayesville soil but that have less clay in the subsoil or are shallower to bedrock than the Hayesville soil. Also included in mapping are small areas of soils that have slopes of less than 25 percent or more than 45 percent and small areas of soils that have gravel, cobbles, and rock outcrops on the surface. The included soils make up 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or moderately acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All of the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Slope and granite stones on the surface prevent tillage.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, birdsfoot trefoil, white clover, ladino clover, and lespedeza. The soil is not suited to hay because of slope and granite stones on the surface. The major limitations to pasture are granite stones on the surface, slope, acidity, and low natural fertility. Slope and granite stones on the surface impede or prevent application of pasture management practices, such as seeding, liming, fertilizing, and weed control.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 290 board feet on north-facing slopes and 250 board feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, plant competition, and, on south-facing slopes, seedling mortality. The common trees are mixed hardwoods, shortleaf pine, Virginia pine, and eastern white pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, seepage, clayey subsoil, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Slope and low strength limit its use for local roads and streets and as roadfill. Slope, seepage, and clayey subsoil limit its use as sites for trench type sanitary landfills. Slope and clayey subsoil limit its use as daily cover for sanitary landfills.

This soil is in capability subclass VIIs.

**18B—Helena fine sandy loam, 2 to 7 percent slopes.** This is a deep, moderately well drained, gently sloping soil on narrow to broad, convex, Piedmont uplands. Slopes are smooth. Areas of the soil are commonly irregular in shape. They range from 4 to about 15 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam about 5 inches thick. The subsoil is about 50 inches thick. It is yellowish brown sandy clay loam to a depth of 13 inches and light yellowish brown clay to a depth of 19 inches. It is mottled, dominantly strong brown clay to a depth of 48 inches and dominantly yellowish brown clay loam to a depth of 59 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered gneiss that crushes to fine sandy loam.

Included with this soil in mapping are small areas of Cecil, Iredell, Madison, Mattaponi, and Vance soils. Also included are soils that are similar to the Helena soil but that have many mica flakes in the subsoil. Also included are small areas of soils that have slopes of 7 to 15 percent and small wet spots. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* High
*Depth to high water table:* 18 to 30 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is used for cultivated crops. A moderate acreage is used for pasture or grass hay. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. In some years the seasonal high water table delays spring planting or interferes with harvest in fall. In some areas the seasonal high water table and the very firm, clay subsoil restrict depth of root growth. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, birdsfoot trefoil, and lespedeza. It is not suited to alfalfa. The major limitations to pasture are the seasonal high water table, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The seasonal perched high water table limits woodland use and management. The major woodland management problem is the equipment limitation. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Harvesting during dry seasons helps to reduce rutting on skid trails.

The major limitations of this soil for most urban uses are the seasonal high water table, slowly permeable subsoil, depth to bedrock, clay subsoil, slope, shrinking and swelling, and low strength. Depth to bedrock limits use of the soil as sites for sewage lagoons. Depth to bedrock, the seasonal high water table, and clay subsoil limit its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The seasonal high water table limits use of the soil as sites for shallow excavations and for lawns and landscaping. Shrinking and swelling limit its use as sites for dwellings without basements and small commercial buildings. The seasonal high water table and shrinking and swelling limit its use as sites for dwellings and basements. Low strength and shrinking and swelling limit its use for local roads and streets and as roadfill. The seasonal high water table and slowly permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**18C—Helena fine sandy loam, 7 to 15 percent slopes.** This is a deep, moderately well drained, strongly sloping soil commonly on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are long and narrow or irregular in shape. They range from 4 to about 15 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is light yellowish brown fine sandy loam about 5 inches thick. The subsoil is about 50 inches thick. It is yellowish brown sandy clay loam to a depth of 13 inches and light yellowish brown clay to a depth of 19 inches. It is mottled, dominantly strong brown clay to a depth of 48 inches and dominantly yellowish brown clay loam to a depth of 59 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered gneiss that crushes to fine sandy loam.

Included with this soil in mapping are small areas of Cecil, Iredell, Madison, Mattaponi, and Vance soils. Also included are soils that are similar to the Helena soil but that have many mica flakes in the subsoil. Also included are small areas of soils that have slopes of less than 7 percent and small wet areas. These included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* High
*Depth to high water table:* 18 to 30 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A moderate acreage is used for pasture or grass hay. A small acreage is used for cultivated crops.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. In some years the seasonal high water table delays planting in spring or interferes with harvest in fall. In some areas the seasonal high water table and the very firm, clay subsoil restrict depth of root growth. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, grassed waterways, contour tillage, contour stripcropping, cover crops, and grasses and legumes in the cropping system help to maintain soil tilth, to reduce runoff, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, birdsfoot trefoil, and lespedeza. It is not suited to alfalfa. The major limitations to pasture are the seasonal high water table, acidity, and low natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The seasonal high water table limits woodland use and management. The major woodland management problem is the equipment limitation. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion. Harvesting during dry seasons helps to reduce rutting on skid trails.

The major limitations of this soil for most urban uses are the seasonal high water table, slowly permeable subsoil, slope, depth to bedrock, clay subsoil, shrinking and swelling, and low strength. Slope limits use of the soil as sites for sewage lagoons. Depth to bedrock, the seasonal high water table, and clay subsoil limit its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The seasonal high water table limits its use as sites for shallow excavations. Shrinking and swelling limits its use as sites for dwellings without basements. The seasonal high water table and shrinking and swelling limit its use as sites for dwellings with basements. Shrinking and swelling and slope limit its use as sites for small commercial buildings. Low strength and shrinking and swelling limit its use for local roads and streets and as roadfill. The seasonal high water table and slope limit its use for lawns and landscaping. The seasonal high water table and the slowly permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**19B—Iredell fine sandy loam, 2 to 7 percent slopes.** This is a very deep, gently sloping, moderately well drained or somewhat poorly drained soil on the Piedmont uplands. Slopes are smooth. Areas of the soil commonly are irregularly shaped. They range from 4 to more than 50 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer is light brownish gray fine sandy loam to a depth of about 11 inches. The subsoil is about 26 inches thick. It is dark yellowish brown to a depth of 27 inches and dark yellowish brown, mottled, clay loam to a depth of 37 inches. The substratum extends to a depth of 72 inches. It is multicolored saprolite of basic rock that crushes to sandy clay loam.

Included with this soil in mapping are small intermingled areas of Helena, Mecklenburg, and Poindexter soils. Also included are small areas of soils that have slope of 0 to 2 percent or 7 to 15 percent and small areas of severely eroded soils. Also included are small areas of soils that have gravel or cobbles on the surface and areas of soils that have hard bedrock at a depth of 40 to 60 inches. The included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium

*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* High
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Very high
*Depth to high water table:* 12 to 24 inches
*Flooding:* None

A large acreage of this soil is woodland. A moderate acreage is used for pasture. A very small acreage of this soil is used for cultivated crops.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. In some years the seasonal high water table delays planting in spring and limits rooting depth. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, cover crops, grasses and legumes included in the cropping system, and grassed waterways help to reduce runoff, to control erosion, to maintain soil tilth, to increase water infiltration, and to increase productivity.

This soil is well suited to pasture grasses and legumes, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are the seasonal high water table, acidity, and medium natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 90 cubic feet. Clay subsoil limits woodland use and management. Major woodland management problems are the equipment limitation, seedling mortality, and windthrow hazard. The common trees are loblolly pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion. Harvesting during dry seasons helps to reduce rutting on skid trails.

The main limitations of this soil for urban uses are shrinking and swelling, the seasonal high water table, low strength, slowly permeable subsoil, slope, and clay subsoil. The seasonal high water table limits use of the soil as sites for sewage lagoons and shallow excavations and for lawns and landscaping. The seasonal high water table and shrinking and swelling limit its use as sites for dwellings with or without basements, and small commercial buildings. Low strength and shrinking and swelling limit its use for local roads and streets and as roadfill. The seasonal high water table and clay subsoil limit its use as sites for trench type sanitary landfills. Clay subsoil and the seasonal high water limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. The seasonal high water table and slowly permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**19C—Iredell fine sandy loam, 7 to 15 percent slopes.** This is a very deep, strongly sloping, moderately well drained or somewhat poorly drained soil on side slopes of the Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil follow side slopes and are long, narrow, and winding. They range from 4 to about 40 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer is light brownish gray fine sandy loam to a depth of about 11 inches. The subsoil is about 26 inches thick. It is dark yellowish brown clay to a depth of 27 inches and mottled, dark yellowish brown clay loam to a depth of 37 inches. The substratum extends to a depth of 72 inches. It is multicolored saprolite of basic rock that crushes to sandy clay loam.

Included with this soil in mapping are small intermingled areas of Helena, Mecklenburg, and Poindexter soils. Also included are small areas of soils that have slopes of 2 to 7 percent and small areas of severely eroded soils. Also included are small areas of soils that have gravel, cobbles, and stones on the surface and areas of soils that have hard bedrock at a depth of 40 to 60 inches. These included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Poor
*Organic matter content:* Low
*Natural fertility:* High
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Very high
*Depth to high water table:* 12 to 24 inches
*Flooding:* None

A large acreage of this soil is woodland. A small acreage is used for pasture. A very small acreage is used for cultivated crops.

This soil is poorly suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. In some years the seasonal high water table delays planting in spring and restricts rooting depth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, cover crops, grasses and legumes in the cropping system, and grassed waterways help to reduce runoff, to control erosion, to maintain soil tilth, to increase water infiltration, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are the seasonal high water table, acidity in some areas, and medium natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 90 cubic feet. The clayey subsoil limits woodland use and management. Major woodland management problems are the equipment limitation, seedling mortality, and windthrow hazard. The common trees are loblolly pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion. Harvesting during dry seasons helps to reduce rutting on skid trails.

The main limitations of this soil for urban uses are shrinking and swelling, the seasonal high water table, low strength, slowly permeable subsoil, slope, and clayey subsoil. Slope and the seasonal high water table limit use of the soil as sites for sewage lagoons and for lawns and landscaping. The seasonal high water table and shrinking and swelling limit its use as sites for dwellings with or without basements. Low strength and shrinking and swelling limit its use for local roads and streets and as roadfill. The seasonal high water table, shrinking and swelling, and slope limit its use as sites for small commercial buildings. The seasonal high water table limits its use as sites for shallow excavations. The seasonal high water table and clayey subsoil limit its use as sites for trench type sanitary landfills. Clayey subsoil and the seasonal high water table limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. The seasonal high water table and the slowly permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**20B—Laidig gravelly fine sandy loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on convex ridgetops extending from the base of the Blue Ridge Mountains. Slopes are smooth. Areas of the soil are long, and narrow or wide, or they are irregular in shape. They range from 4 to about 50 acres in size.

Typically, the surface layer is yellowish brown gravelly fine sandy loam about 7 inches thick. The subsoil is about 54 inches thick. It is yellowish brown loam to a depth of 11 inches and strong brown clay loam to a depth of 27 inches. Below that, it is yellowish brown sandy clay loam to a depth of 36 inches and, to a depth of 61 inches, dominantly mottled yellowish red sandy clay loam that is firm and brittle. The substratum, to a depth of 72 inches, is dominantly mottled yellowish red sandy clay loam.

Included with this soil in mapping are small areas of Braddock and Sequoia soils and soils that are similar to the Laidig soil but that do not have a fragipan in the subsoil and that in some pedons have gray mottles in the lower part of the subsoil. Also included in mapping are small areas of soils that have slopes of more than 7 percent and small areas of soils that have cobbles on the surface. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid above the fragipan and slow or moderately slow in the fragipan
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 30 to 48 inches
*Flooding:* None

Much of the acreage of this soil is woodland. A moderate acreage is used for pasture or hay. A small acreage is used for cultivated crops. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, and small grains. Erosion potential is medium, and is a management concern. In some years the seasonal high water table interferes with land preparation and planting crops in spring or harvesting crops in fall. The high content of gravel in the surface layer impedes tillage. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, cover crops, grassed waterways, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as tall fescue, midland bermudagrass, bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are the gravelly surface layer, acidity, and low natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, restricted grazing when the soil is wet, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 270 board feet. The soil is easily managed for woodland. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion. Harvesting during dry seasons helps reduce rutting on skid trails.

The major limitations of this soil for most urban uses are slowly permeable subsoil, the seasonal high water table, low strength, slope, and small stones on the surface. The seasonal high water table limits use of soil as sites for trench type sanitary landfills, shallow excavations, and dwellings with basements. Low strength limits use of the soil for local roads and streets and as roadfill. Small stones on the surface limits use of the soil for lawns and landscaping. Slope limits its use as sites for small commercial buildings. Small stones and the seasonal high water table limit its use as daily cover for sanitary landfills. Seepage and the seasonal high water table limit its use as sites for sewage lagoons. Slowly permeable subsoil and the seasonal high water table limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**20C—Laidig gravelly fine sandy loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on convex ridgetops and side slopes of ridges extending from the base of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are long, and narrow or wide, or they are irregular in shape. They range from 4 to about 40 acres in size.

Typically, the surface layer is yellowish brown gravelly fine sandy loam about 7 inches thick. The subsoil is about 54 inches thick. It is yellowish brown loam to a depth of 11 inches and strong brown clay loam to a depth of 27 inches. It is yellowish brown sandy clay loam to a depth of 36 inches and firm and brittle, dominantly mottled yellowish red sandy clay loam to a depth of 61 inches. The substratum extends to a depth of 72 inches. It is dominantly mottled yellowish red sandy clay loam.

Included with this soil in mapping are small areas of Braddock and Sequoia soils and soils that are similar to the Laidig soil but that do not have a fragipan in the subsoil and in some pedons have gray mottles in the lower part of the subsoil. Also included in mapping are small areas of soils that have slopes of less than 7 percent or more than 15 percent and small areas of soils that have cobbles on the surface. The included soils make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate or moderately rapid above the fragipan and slow or moderately slow in the fragipan
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 30 to 48 inches
*Flooding:* None

A large amount of the acreage of this soil is woodland. A moderate acreage is used for pasture. A small acreage is used for cultivated crops.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, and small grains. Erosion potential is medium, and is a management concern. In some years the seasonal high water table interferes with land preparation and planting crops in spring or harvesting crops in fall. The high content of gravel in the surface layer impedes tillage. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, midland bermudagrass, bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are the gravelly surface layer, acidity, and low natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, restricted grazing when the soil is wet, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 270 board feet. The soil is easily managed for woodland. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion. Harvesting during dry seasons helps to reduce rutting on skid trails.

The major limitations of this soil for most urban uses are slowly permeable subsoil, the seasonal high water table, slope, low strength, seepage, and small stones on the surface. The seasonal high water table and slope limit use of the soil as sites for trench type sanitary landfills, shallow excavations, and dwellings with basements. Slope limits its use as sites for dwellings without basements and small commercial buildings. Low strength limits its use as roadfill. Slope and low strength limit its use for local roads and streets. Small stones on the surface, slope, and the seasonal high water table limit its use as daily cover for sanitary landfills. Small stones on the surface and slope limit its use for lawns and landscaping. Seepage, slope, and the seasonal high water table limit its use as sites for sewage lagoons. The slowly permeable subsoil and the seasonal high water table limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**21D3—Madison sandy clay loam, 15 to 25 percent slopes, severely eroded.** This is a very deep, well drained, moderately steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding (fig. 9). They range from 3 to about 200 acres in size.

Typically, the surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil is about 23 inches thick and has many mica flakes. It is red clay to a depth of 25 inches and red loam to a depth of 30 inches. The substratum extends to a depth of 72 inches. It is multicolored saprolite of mica gneiss that has many flakes of mica and that crushes to loam or sandy loam.

Included with this soil in mapping are small areas of Cecil, Cullen, Grover, Poindexter, Sweetapple, and Wateree soils and soils that are similar to the Madison soil but that have a thicker solum depth. Also included in mapping are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent. Also included are small areas of soils that have gravel and cobbles on the surface, small gullied areas, and areas of soils that are not severely eroded. The included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A moderate acreage is used for pasture. A small acreage is used for cultivated crops.

Because of the erosion potential, this soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high, and is a management concern. The high clay content in the plow layer caused by erosion, and very rapid surface runoff tend to make the soil droughty and limit establishing vegetation on the soil.

This soil is moderately well suited to pasture grasses and legumes, such as tall fescue, bermudagrass, birdsfoot trefoil, and lespedeza. It is not suited to hay because of droughtiness. The major limitations to pasture are acidity, low natural fertility, droughtiness, and slope. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per

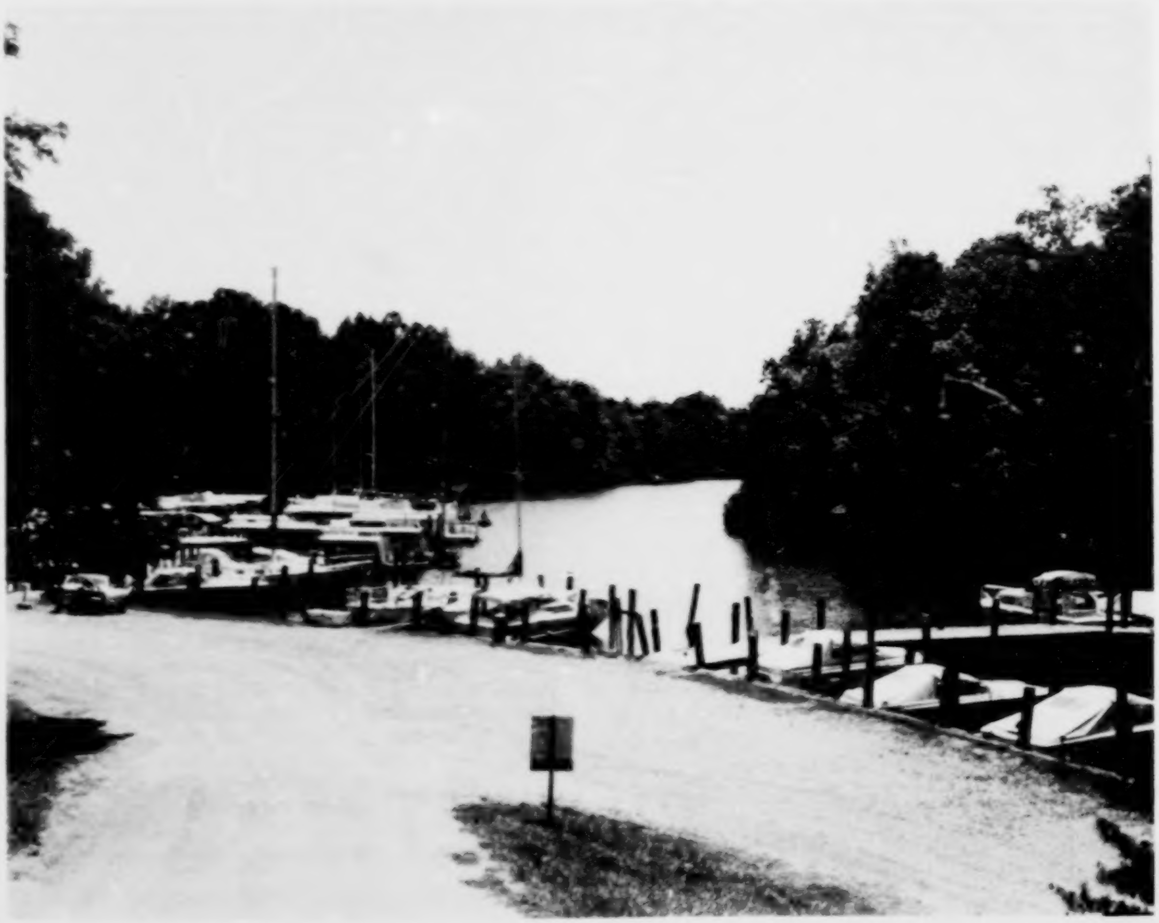


Figure 9.—Recreational boat marina on Smith Mountain Lake. The soil along the shore is Madison sandy clay loam, 15 to 25 percent slopes, severely eroded.

acre is 100 cubic feet on north-facing slopes and 80 cubic feet on south-facing slopes. The clay content in the upper part of the soil limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, trench type sanitary landfills, shallow excavations, dwellings with or without basements, and small commercial buildings. Slope also limits its use as daily cover for sanitary landfills, for local roads and streets, and for lawns and landscaping. Low strength limits its use as roadfill.

This soil is in capability subclass VIe.

**21E3—Madison sandy clay loam, 25 to 40 percent slopes, severely eroded.** This is a very deep, well drained, steep soil on side slopes of the Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil follow side slopes and are commonly long, narrow, and winding. They range from 4 to about 40 acres in size.

Typically, the surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil is about 23 inches thick and has many mica flakes. It is red clay to a depth of 25 inches and red loam to a depth of 30 inches. The substratum extends to a depth of 72 inches. It is multicolored saprolite of mica gneiss that has many flakes of mica and that crushes to loam or sandy loam.

Included with this soil in mapping are small areas of Grover, Poindexter, Sweetapple, and Wateree soils. Also included in mapping are small areas of soils that have slopes of 15 to 25 percent or more than 40 percent and small areas of soils that have gravel or cobbles on the surface layer. Also included are small gullied areas and areas of soils that are not severely eroded. The included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A moderate acreage is used for pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. The high clay content in the plow layer caused by erosion, and very rapid surface runoff tend to make the soil droughty and limit establishing vegetation on the soil.

This soil is poorly suited to pasture grasses and legumes, such as tall fescue, bermudagrass, birdsfoot trefoil, and lespedeza. It is not suited to hay because of droughtiness, slope, and the severe erosion hazard. The major limitations to pasture are slope, droughtiness caused by severe erosion, the high erosion potential, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 100 cubic feet on north-facing slopes and 80 cubic feet on south-facing slopes. The clay content in the upper part of the soil limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitation of this soil for most urban uses is slope. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, trench type sanitary landfills, shallow excavations, dwellings with or without basements, and small commercial buildings. Slope also limits its use as daily cover for sanitary landfills, for local roads and streets, as roadfill, and for lawns and landscaping.

This soil is in capability subclass VIIe.

**22D—Manteo channery silt loam, 15 to 25 percent slopes.** This is a shallow, somewhat excessively drained, moderately steep soil on side slopes on Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 74 acres in size.

Typically, the surface layer is yellowish brown channery silt loam about 7 inches thick. The subsoil is strong brown very channery silt loam about 10 inches thick. Hard sericite schist bedrock is at a depth of 17 inches.

Included with this soil in mapping are small areas of Nason and Tatum soils. Also included are small areas of soils that are similar to the Manteo soil but that have more clay than or are deeper to bedrock than the Manteo soil. Also included are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent. Also included are small gullied areas, small areas of soils that have cobbles or stones on the surface, and areas of rock outcrops. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Very low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low

*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 10 to 20 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A small acreage is pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. Slope and the high content or rock fragments in the surface layer nearly prohibit tillage.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, birdsfoot trefoil, and lespedeza. The soil is not suited to hay. The major limitations to pasture are slope, droughtiness, the channery surface layer, acidity, and low natural fertility. These limitations prevent the application of pasture management practices, such as seeding, liming, fertilizing, and weed control. Preventing overgrazing helps to maintain the stand of pasture plants and to control erosion.

Potential productivity for loblolly pine is high on north-facing slopes and moderately high on south-facing slopes. Estimated average annual production of wood per acre is 90 cubic feet on north-facing slopes and 75 cubic feet on south-facing slopes. Rooting depth is restricted because of shallow depth to bedrock. Major woodland management problems are the equipment limitation, seedling mortality on south-facing slopes, and the windthrow hazard. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, seepage, the thin layer of suitable soil material, small stones, and difficulty in reclaiming the area. Slope and depth to bedrock limit use of the soil as sites for septic tank absorption fields, shallow excavations, dwellings with or without basements, and small commercial buildings, and for local roads and streets. Slope, depth to bedrock, and seepage limit its use as sites for sewage lagoons and trench type sanitary landfills. Slope, difficulty in reclaiming the area, and small stones limit use of the soil as daily cover for sanitary landfills. Slope and the thin layer of suitable soil material limit use of the soil for lawns and landscaping. Difficulty in reclaiming the area limits its use as roadfill.

This soil is in capability subclass VIIe.

**22E—Manteo channery silt loam, 25 to 60 percent slopes.** This is a shallow, somewhat excessively drained, steep and very steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 50 acres in size.

Typically, the surface layer is yellowish brown channery silt loam about 7 inches thick. The subsoil is strong brown very channery silt loam about 10 inches thick. Hard, sericite schist bedrock is at a depth of 17 inches.

Included with this soil in mapping are small areas of Nason soils and soils that are similar to this Manteo soil but that have more clay than or are deeper to bedrock than the Manteo soil. Also included are small areas of soils that have slopes of less than 25 percent or more than 60 percent. Also included are small gullied areas, small areas of soils that have cobbles or stones on the surface, and areas of rock outcrops. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Very low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Poor
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 10 to 20 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

Almost all of the acreage of this soil is woodland. A small acreage is pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high. The high content of rock fragments and slope nearly prohibit tillage.

This soil is not suited to pasture and hay plants, such as tall fescue, bermudagrass, birdsfoot trefoil, and lespedeza. The major limitations of this soil to pasture and hayland are slope, droughtiness, the channery surface layer, acidity, and low natural fertility. These limitations prevent the application of pasture management practices, such as seeding, liming, fertilizing, and weed control.

Potential productivity for loblolly pine is high on north-facing slopes and moderately high on south-facing slopes. Estimated average annual production of wood per acre is 90 cubic feet on north-facing slopes and 75 cubic feet on south-facing slopes. Rooting depth is restricted because of shallow depth to bedrock. Major woodland management problems are the erosion hazard, the equipment limitation, seedling mortality on south-facing slopes, and the windthrow hazard. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, seepage, the thin layer of suitable soil material, small stones, and difficulty in reclaiming the area. Slope and depth to bedrock limit use of the soil as sites for septic tank absorption fields, shallow excavations, dwellings with or without basements, and small commercial buildings, and for local roads and streets. Slope, depth to bedrock, and seepage limit its use as sites for sewage lagoons and trench type sanitary landfills. Slope, difficulty in reclaiming the area, and small stones limit use of the soil as daily cover for sanitary landfills. Slope and difficulty in reclaiming the area limit use of the soil as roadfill. Slope and the thin layer of suitable soil material limit use of the soil for lawns and landscaping.

This soil is in capability subclass VIIe.

**23B—Mattaponi sandy loam, 2 to 7 percent slopes.** This is a very deep, moderately well drained, gently sloping soil on rises on Piedmont uplands. Slopes are smooth. Areas of the soil are commonly irregular in shape. They range from 4 to about 20 acres in size.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is more than 62 inches thick. It is strong brown clay to a depth of 22 inches, mottled strong brown clay to a depth of 53 inches, and dominantly mottled yellowish brown clay loam to a depth of 72 inches or more.

Included with this soil in mapping are small areas of Cecil, Helena, and Vance soils and soils that are similar to the Mattaponi soil but that do not have gray mottles in the subsoil. Also included in mapping are small wet spots and small areas of soils that have slopes of 7 to 15 percent. The included areas make up about 15 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately slow
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* 36 to 72 inches
*Flooding:* None

Most of the acreage of this soil is used for hay and pasture. A moderate acreage is woodland. A small acreage is used for cultivated crops. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains (fig. 10). Erosion potential is medium, and is a management concern. In some years the seasonal high water table delays spring planting. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, grassed waterways, contour tillage, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to control erosion, to increase water infiltration, and to increase productivity.

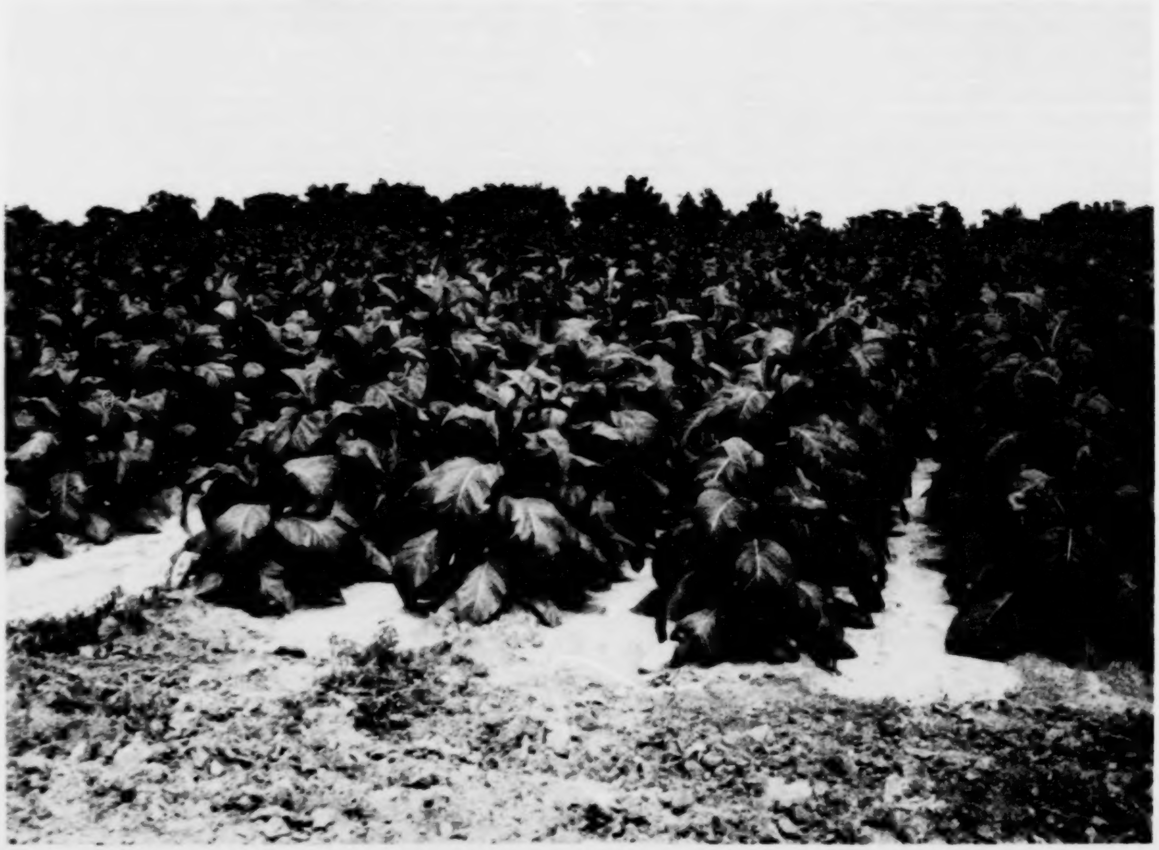


**Figure 10.—Flue-cured tobacco on Mattaponi sandy loam, 2 to 7 percent slopes.**

This soil is well suited to pasture and hay plants, such as orchardgrass, tall fescue, bermudagrass, midland bermudagrass, red clover, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. The major woodland management problem is plant competition. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are permeability, the seasonal high water table, slope, low strength, clayey subsoil, and shrinking and swelling. The seasonal high water table limits use of the soil as sites for sewage lagoons. The clayey subsoil limits its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The clayey subsoil and the seasonal high water table limit its use as sites for shallow excavations. Shrinking and swelling limits its use as sites for dwellings without basements. The seasonal high water table and shrinking and swelling limit its use as sites for dwellings with basements. Shrinking and swelling and slope limit its use as sites for small commercial buildings. Low strength limits its use for local roads and streets and as roadfill. There are no limitations to its use for lawns and landscaping. Permeability and the seasonal high water table limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**23C—Mattaponi sandy loam, 7 to 15 percent slopes.** This is a very deep, moderately well drained, strongly sloping soil commonly on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 15 acres in size. Areas of the soil are commonly dissected by short drainageways.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is more than 62 inches thick. It is strong brown clay to a depth of 22 inches, mottled strong brown clay to a depth of 53 inches, and dominantly mottled yellowish brown clay loam to a depth of 72 inches or more.

Included with this soil in mapping are small areas of Cecil, Helena, and Vance soils and soils that are similar to the Mattaponi soil but that do not have gray mottles in the subsoil. Also included in mapping are small areas of wet soils at the base of slopes and small areas of soils that have slopes of less than 7 percent or of 15 to 20 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately slow
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* 36 to 72 inches
*Flooding:* None

Most of the acreage of this soil is used for hay or pasture. A moderate acreage is woodland. A small acreage is used for cultivated crops.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. In some years the seasonal high water table delays spring planting. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, grassed waterways, contour tillage, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to control erosion, to increase water infiltration, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescuegrass, bermudagrass, midland bermudagrass, red clover, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. The major woodland management problem is plant competition. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are permeability, the seasonal high water table, slope, low strength, clayey subsoil, and shrinking and swelling. Slope and the seasonal high water table limit use of the soil as sites for sewage lagoons. The clayey subsoil limits use of the soil as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The clayey subsoil, the seasonal high water table, and slope limit its use as sites for shallow excavations. Shrinking and swelling and slope limit its use as sites for dwellings without basements. The seasonal high water table, slope, and shrinking and swelling limit its use as sites for dwellings with basements. Slope limits its use as sites for small commercial buildings and for lawns and landscaping. Low strength limits its use for local roads and streets and as roadfill. The seasonal high water table and permeability limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**24B—Mecklenburg loam, 2 to 7 percent slopes.** This is a deep, gently sloping, well drained soil on rises of Piedmont uplands. Slopes are smooth. Areas of the soil are irregularly shaped. They range from 4 to about 20 acres in size.

Typically, the surface layer is reddish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is red clay to a depth of 17 inches and yellowish red clay loam to a depth of 41 inches. The substratum extends to a depth of 72 inches. It is weathered hornblende gneiss that crushes to fine sandy loam.

Included with this soil in mapping are intermingled areas of Cecil, Cullen, Iredell, Madison, and Poindexter soils and soils that are similar to the Mecklenburg soil but that have a higher base saturation or a moderately permeable clay subsoil or are shallower to bedrock than the Mecklenburg soil. Also included are small areas of soils that have slopes of 7 to 15 percent, small areas of severely eroded soils, and areas that have a gravelly surface layer. The included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Medium
*Soil reaction:* Moderately acid to neutral
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage is used for pasture or hay. A moderate acreage is woodland. A small acreage is used for cultivated crops. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, grassed waterways, conservation tillage, contour tillage, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to reduce runoff, to control erosion, to maintain soil tilth, to increase water infiltration, and to increase productivity.

This soil is well suited to pasture and hay plants, such as bermudagrass, midland bermudagrass, orchardgrass, tall fescue, ladino clover, alfalfa, red clover, and lespedeza. The major limitations to pasture and hayland are acidity and medium natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 100 cubic feet. The soil is easily managed for woodland. There are no major woodland management problems. The common trees are loblolly pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, slowly permeable subsoil, depth to bedrock, clayey subsoil, shrinking and swelling, and low strength. Slope limits use of the soil as sites for sewage lagoons. Depth to bedrock and clayey subsoil limit use of the soil as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The clayey subsoil limits its use as sites for shallow excavations. Shrinking and swelling limits its use as sites for dwellings with or without basements. Slope and shrinking and swelling limit its use as sites for small commercial buildings. Low strength limits its use for local roads and streets and as roadfill. There are no significant limitations to its use for lawns and landscaping. The slowly permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**24C—Mecklenburg loam, 7 to 15 percent slopes.** This is a deep, strongly sloping, well drained soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil follow the side slopes and are narrow, long, and winding. They range from 4 to about 15 acres in size.

Typically, the surface layer is reddish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is red clay to a depth of 17 inches and yellowish red clay loam to a depth of 41 inches. The substratum extends to a depth of 72 inches. It is weathered hornblende gneiss that crushes to fine sandy loam.

Included with this soil in mapping are small areas of Cecil, Cullen, Iredell, Madison, and Poindexter soils and soils that are similar to the Mecklenburg soil but that have a higher base saturation or a moderately permeable clay subsoil or are shallower to bedrock than the Mecklenburg soil. Also included are small areas of soils that have slopes of 2 to 7 percent or 15 to 25 percent, small areas of severely eroded soils, and areas that have a gravelly surface layer. The included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Medium
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage of this soil is used for pasture or hay. A moderate acreage is woodland. A small acreage is used for cultivated crops.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, cover crops, grasses and legumes included in the cropping system, and grassed waterways help to reduce runoff, to control erosion, to maintain soil tilth, to increase water infiltration, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, bermudagrass, midland bermudagrass, red clover, white clover, ladino clover, alfalfa, and lespedeza. The major limitations to pasture and hayland are acidity and medium natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 100 cubic feet. The soil is easily managed for woodland. The commonly grown trees are loblolly pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, slowly permeable subsoil, depth to bedrock, clayey subsoil, shrinking and swelling, and low strength. Slope limits use of the soil as sites for sewage lagoons and small commercial buildings, and for lawns and landscaping. Depth to bedrock and clayey subsoil limit its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The clayey subsoil and slope limit its use as sites for shallow excavations. Shrinking and swelling and slope limit its use as sites for dwellings with or without basements. Low strength limits its use for local roads and streets and as roadfill. The slowly permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**24D—Mecklenburg loam, 15 to 25 percent slopes.** This is a deep, moderately steep, well drained soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are narrow, long, and winding. They range from 4 to about 15 acres in size.

Typically, the surface layer is reddish brown loam about 5 inches thick. The subsoil is about 36 inches thick. It is red clay to a depth of 17 inches and yellowish red clay loam to a depth of 41 inches. The substratum extends to a depth of 72 inches. It is weathered hornblende gneiss that crushes to fine sandy loam.

Included with this soil in mapping are small areas of Cullen, Madison, and Poindexter soils and soils that are similar to the Mecklenburg soil but that have a higher base saturation or a moderately permeable clay subsoil or are shallower to bedrock than the Mecklenburg soil. Also included are small areas of soils that have slopes of 7 to 15 percent, small areas of severely eroded soils, small gullied areas, and areas that have a gravelly surface layer. The included areas make up as much as 25 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Medium
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A small acreage is used for pasture or hay.

This soil is poorly suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is high.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, red clover, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are slope, acidity, and medium natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 100 cubic feet on north-facing slopes and 80 cubic feet on south-facing slopes. The soil is easily managed for woodland use. The major woodland management problem is seedling mortality on south-facing slopes. The common trees are loblolly pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, slowly permeable subsoil, depth to bedrock, clayey subsoil, and low strength. Slope limits use of the soil as sites for sewage lagoons, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Depth to bedrock, slope, and clayey subsoil limit its use as sites for trench type sanitary landfills. The clayey subsoil and slope limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Low strength and slope limit its use for local roads and streets. Low strength limits its use as roadfill. The slowly permeable subsoil and slope limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IVe.

**25C—Nason gravelly silt loam, 7 to 15 percent slopes.** This is a deep, well drained, strongly sloping soil on rises and side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are irregular in shape on rises and long, narrow, and winding on side slopes. They range from 4 to more than 200 acres in size.

Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is about 36 inches thick. It is yellowish red silty clay loam to a depth of 8 inches, yellowish red silty clay to a depth of 33 inches, and yellowish red channery silty clay loam to a depth of 41 inches. The substratum extends to a depth of 48 inches. It is multicolored saprolite of sericite schist that crushes to channery silt loam. Multicolored, fractured, sericite schist bedrock is at a depth of 48 inches.

Included with this soil in mapping are small areas of Manteo and Tatum soils. Also included are small areas of soils that are similar to the Nason soil but that have less clay in the subsoil than the Nason soil or are less than 40 inches deep to bedrock. Also included are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent and small gullied areas. Also included are small spots of severely eroded soils, small areas of soils where cobbles are on the surface, and small rock outcrops. The included areas make up about 30 percent of some map units.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A very small acreage is used for cultivated crops. A small acreage is pasture.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion is a hazard, and is a management concern. The soil is difficult to till because of gravel in the surface layer. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crop response to lime and fertilizer is limited by the lack of moisture. A major problem is establishing and maintaining the proper soil reaction. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to increase water infiltration, to reduce runoff, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are the gravelly surface layer, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Major pasture management practices are proper stocking rates to maintain desirable grasses and legumes, rotational grazing, deferred grazing, weed control, and applying lime and fertilizer to increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. There are no significant limitations to woodland use and management. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, moderately permeable subsoil, clayey subsoil, low strength, gravel in the surface layer, and shrinking and swelling. Slope limits use of the soil as sites for sewage lagoons and small commercial buildings. The clayey subsoil and depth to bedrock limit its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Slope and clayey subsoil limit its use as sites for shallow excavations. Slope and shrinking and swelling limit its use as sites for dwellings with or without basements. Low strength limits its use for roadfill and for local roads and streets. Slope and gravel in the surface layer limit its use for lawns and landscaping. Slope, moderately permeable subsoil, and depth to bedrock limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**25D—Nason gravelly silt loam, 15 to 25 percent slopes.** This is a deep, well drained, moderately steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly narrow, long, and winding. They range from 4 to about 80 acres in size. Areas of the soil are commonly dissected by short drainageways.

Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is about 36 inches thick. It is yellowish red silty clay loam to a depth of 8 inches, yellowish red silty clay to a depth of 33 inches, and yellowish red channery silty clay loam to a depth of 41 inches. The substratum extends to a depth of 48 inches. It is multicolored saprolite of sericite schist that crushes to channery silt loam. Multicolored, fractured, sericite schist bedrock is at a depth of 48 inches.

Included with this soil in mapping are small areas of Manteo and Tatum soils. Also included in mapping are small areas of soils that are similar to the Nason soil but that are less than 40 inches deep to bedrock or that are dominantly clay loam or silty clay loam in the subsoil. Also included are small areas of soils that have slopes of 7 to 15 percent or more than 25 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have cobbles or rock outcrops on the surface. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A very small acreage is used for pasture.

This soil is poorly suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is high, and is a management concern. The gravel in the surface layer impedes tillage. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crop response to lime and fertilizer is limited by the lack of moisture. A major problem is establishing and maintaining the proper soil reaction. If the soil is cultivated, minimum tillage, stubble mulching, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to increase water infiltration, to reduce runoff, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are slope, the gravelly surface layer, acidity, and low natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet on north-facing slopes and 100 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, clayey subsoil, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Depth to bedrock, slope, and clayey subsoil limit its use as sites for trench type sanitary landfills. Slope and clayey subsoil limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Slope and low strength limit its use for local roads and streets. Low strength limits its use as roadfill.

This soil is in capability subclass IVe.

**25E—Nason gravelly silt loam, 25 to 40 percent slopes.** This is a deep, well drained, steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 30 acres in size. Areas of the soil are commonly dissected by short drainageways.

Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is about 36 inches thick. It is yellowish red silty clay loam to a depth of 8 inches, yellowish red silty clay to a depth of 33 inches, and yellowish red channery silty clay loam to a depth of 41 inches. The substratum extends to a depth of 48 inches. It is multicolored saprolite of sericite schist that crushes to channery silt loam. Multicolored, fractured, sericite schist bedrock is at a depth of 48 inches.

Included with this soil in mapping are small areas of Manteo and Tatum soils and soils that are similar to the Nason soil but that are dominantly clay loam or silty clay loam in the subsoil or are less than 40 inches to bedrock. Also included are small areas of soils that have slopes of 15 to 25 percent or more than 40 percent, small gullied areas, and small areas of soils that have cobbles or rock outcrops on the surface. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

All of the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high.

This soil is moderately well suited to some pasture grasses and legumes, such as tall fescue, bermudagrass, birdsfoot trefoil, and lespedeza. It is not suited to hay because of slope. The major limitations to pasture are acidity, low natural fertility, slope, the gravelly surface layer, and the erosion potential. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet on north-facing slopes and 100 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, replanting with fast-growing trees, clearcutting, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope, depth to bedrock, clayey subsoil, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Depth to bedrock, slope, and clayey subsoil limit its use as sites for trench type sanitary landfills. Slope and clayey subsoil limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Slope and low strength limit its use for local roads and streets. Low strength limits its use as roadfill.

This soil is in capability subclass VIe.

**26C—Poindexter fine sandy loam, 7 to 15 percent slopes.** This is a deep, strongly sloping, well drained soil on rises and side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are irregular in shape or long, narrow, and winding. They range from 4 to about 20 acres in size.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam to a depth of about 9 inches. The subsoil is 13 inches thick. It is dark yellowish brown fine sandy loam to a depth of 11 inches and dark brown sandy clay loam to a depth of 22 inches. The substratum extends to a depth of 41 inches. It is multicolored, weathered basic rock that crushes to fine sandy loam. Hard, hornblende gneiss bedrock is at a depth of 41 inches.

Included with this soil in mapping are intermingled areas of Cullen, Madison, Mecklenburg, and Iredell soils and soils that are similar to the Poindexter soil but that are shallower to bedrock, have a lower base saturation, or have more rock fragments throughout. Also included are small areas of soils that have slopes of less than 7 percent or more than 15 percent. Also included are small areas of severely eroded soils, small gullied areas, and small areas of soils that have gravel, cobbles, stones, and rock outcrops on the surface. The included areas make up as much as 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Low
*Surface runoff:* Rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* High
*Soil reaction:* Strongly acid to neutral
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage is woodland. A small acreage is used for pasture or hay. A very small acreage is used for cultivated crops.

This soil is poorly suited to the cultivated crops commonly grown in the county. Erosion potential is high and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops will respond to lime and fertilizer applied to this soil. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, cover crops, grasses and legumes included in the cropping systems, and grassed waterways help to reduce runoff, to control erosion, to improve soil tilth, to increase water infiltration, and to increase productivity.

This soil is moderately well suited to the pasture and hay plants commonly grown in the county, except alfalfa. The major limitations to pasture and hayland are droughtiness and acidity. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 100 cubic feet. The soil is easily managed for woodland. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are depth to bedrock, slope, seepage, clayey subsoil, difficulty in reclaiming the area, or the thin layer of suitable soil material. Seepage and slope limit use of this soil as sites for sewage lagoons. Depth to bedrock and seepage limit its use as sites for trench type sanitary landfills. The clayey subsoil, difficulty in reclaiming the area, and slope limit its use as daily cover for sanitary landfills. Depth to bedrock and slope limit its use as sites for septic tank absorption fields, shallow excavations, and dwellings with basements. Difficulty in reclaiming the area and the thin layer of suitable soil material limit its use as roadfill. Slope limits its use as sites for dwellings without basements and small commercial buildings, for local roads and streets, and for lawns and landscaping.

This soil is in capability subclass IVe.

**26D—Poindexter fine sandy loam, 15 to 25 percent slopes.** This is a deep, well drained, moderately steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil follow the side slopes of ridges and are commonly long, narrow, and winding. They range from 4 to about 30 acres in size.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam to a depth of 9 inches. The subsoil is about 13 inches thick. It is dark yellowish brown fine sandy loam to a depth of 11 inches and dark brown sandy clay loam to a depth of 22 inches. The substratum extends to a depth of 41 inches. It is multicolored, weathered basic rock that crushes to fine sandy loam. Hard, hornblende gneiss bedrock is at a depth of 41 inches.

Included with this soil in mapping are small areas of Cullen, Mecklenburg, Madison, and Wateree soils and soils that are similar to the Poindexter soil but that are shallower to bedrock, have a lower base saturation, or have more rock fragments throughout. Also included are small areas of soils that have slopes of less than 15 percent or more than 25 percent. Also included are small areas of severely eroded soils, small gullied areas, and small areas of soils that have cobbles, gravel, and rock outcrops on the surface. The included areas make up as much as 15 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* High
*Soil reaction:* Strongly acid to neutral
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A small acreage is used for pasture.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high.

This soil is moderately well suited to pasture and hay plants commonly grown in the county, except alfalfa. The major limitations to pasture and hayland are droughtiness, slope, and acidity. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine is high on north-facing slopes and moderately high on south-facing slopes. Estimated average annual production of wood per acre is 100 cubic feet on north-facing slopes and 75 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, seepage, depth to bedrock, difficulty in reclaiming the area, and the thin layer of suitable soil material. Slope, seepage, and depth to bedrock limit use of the soil as sites for trench type sanitary landfills. Seepage and slope limit its use as sites for sewage lagoons. Difficulty in reclaiming the area, the thin layer of suitable soil material, and slope limit its use as roadfill. Slope limits use of the soil as daily cover for sanitary landfills, as sites for shallow excavations, dwellings with or without basements, small commercial buildings, and septic tank absorption fields, for local roads and streets, and for lawns and landscaping.

This soil is in capability subclass VIe.

**26E—Poindexter fine sandy loam, 25 to 60 percent slopes.** This is a moderately deep, well drained, steep and very steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil follow the side slopes and are commonly long, narrow, and winding. They range from 4 to about 40 acres in size.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsurface layer is brown fine sandy loam to a depth of 9 inches. The subsoil is about 13 inches thick. It is dark yellowish brown fine sandy loam to a depth of 11 inches and dark brown sandy clay loam to a depth of 22 inches. The substratum extends to a depth of 41 inches. It is multicolored, weathered basic rock that crushes to fine sandy loam. Hard, hornblende gneiss bedrock is at a depth of 41 inches.

Included with this soil in mapping are small areas of Grover, Madison, Mecklenburg, Sweetapple, and Wateree soils and soils that are similar to the Poindexter soil but that are shallower to bedrock, have a lower base saturation, or have more rock fragments throughout. Also included are small areas of soils that have slopes of 15 to 25 percent or more than 60 percent. Also included are small gullied areas and small areas of soils that have cobbles, gravel, stones, and rock outcrops on the surface. The included areas make up as much as 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* High
*Soil reaction:* Strongly acid to neutral
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All the acreage of this soil is woodland.

Because of erosion potential, droughtiness, very rapid surface runoff, and slope, this soil is not suited to the cultivated crops commonly grown in the county.

This soil is poorly suited to the pasture plants commonly grown in the county. It is not suited to hay because of slope. The major limitations to pasture are slope and acidity.

Potential productivity for loblolly pine is high on north-facing slopes and moderately high on south-facing slopes. Estimated average annual production of wood per acre is 100 cubic feet on north-facing slopes and 75 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, seepage, and depth to bedrock. Slope and seepage limit use of the soil as sites for sewage lagoons. Depth to bedrock, seepage, and slope limit its use as sites for trench type sanitary landfills. Slope limits its use as sites for shallow excavations, dwellings with or without basements, small commercial buildings, and septic tank absorption fields. Slope also limits its use as daily cover for sanitary landfills, for lawns and landscaping, as roadfill, and for local roads and streets.

This soil is in capability subclass VIIe.

**27C—Sequoia loam, 7 to 15 percent slopes.** This is a moderately deep, well drained, strongly sloping soil on ridgetops and the side slopes of ridges. Slopes are smooth and commonly complex. Areas of the soil are commonly irregular in shape on ridgetops and long, narrow, and winding on the side slopes of ridges. They range from 4 to about 150 acres in size.

Typically, the surface layer is yellowish brown loam about 6 inches thick. The subsoil is about 33 inches thick. It is yellowish brown clay loam to a depth of 10 inches and strong brown clay to a depth of 22 inches. Below that, it is strong brown channery clay to a depth of 35 inches and strong brown extremely channery silty clay loam to a depth of 39 inches. The substratum extends to a depth of 72 inches. It is multicolored, moderately hard shale bedrock.

Included with this soil in mapping are small areas of Berks, Braddock, Laidig, and Thurmont soils and soils that are similar to the Sequoia soil but that formed in interbedded limestone and shale. Also included are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have gravel or cobbles on the surface. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately slow
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A small acreage of this soil is used for cultivated crops. A moderate acreage is used for pasture and hay. A moderate acreage is woodland.

This soil is poorly suited to cultivated crops, such as corn, corn silage, tobacco, and small grains. Erosion is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, lime and fertilizer, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are droughtiness because of depth to soft bedrock, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 280 board feet. The soil is easily managed for woodland. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are depth to bedrock, permeability, slope, clayey subsoil, difficulty in reclaiming the area, shrinking and swelling, low strength, and droughtiness. Depth to bedrock and slope limit use of this soil as sites for sewage lagoons.

Depth to bedrock and clayey subsoil limit its use as sites for trench type sanitary landfills. Difficulty in reclaiming the area and clayey subsoil limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Depth to bedrock, clayey subsoil, and slope limit its use as sites for shallow excavations. Shrinking and swelling and slope limit its use as sites for dwellings without basements and small commercial buildings. Depth to bedrock, slope, and shrinking and swelling limit its use as sites for dwellings with basements. Low strength limits its use for local roads and streets. Droughtiness and slope limit its use for lawns and landscaping. Difficulty in reclaiming the area and low strength limit use of the soil as roadfill. Depth to bedrock and permeability limit use of the soil as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**27D—Sequoia loam, 15 to 25 percent slopes.** This is a moderately deep, well drained, moderately steep soil on side slopes of ridges. Slopes are smooth and commonly complex. Areas of the soil are commonly long, narrow, and winding. They range from 4 to about 50 acres in size.

Typically, the surface layer is yellowish brown loam about 6 inches thick. The subsoil is about 33 inches thick. It is yellowish brown clay loam to a depth of 10 inches and strong brown clay to a depth of 22 inches. Below that, it is strong brown channery clay to a depth of 35 inches and strong brown extremely channery silty clay loam to a depth of 39 inches. The substratum extends to a depth of 72 inches. It is multicolored, moderately hard shale bedrock.

Included with this soil in mapping are small areas of Berks, Braddock, Laidig, and Thurmont soils and soils that are similar to the Sequoia soil but that have less clay in the subsoil than the Sequoia soil or were formed from interbedded limestone and shale. Also included are small areas of soils that have slopes of less than 15 percent or more than 25 percent. Also included are small gullied areas, small areas of rock outcrops, small areas of severely eroded soils, and small areas of soils that have gravel or cobbles on the surface. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately slow
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large amount of the acreage of this soil is woodland. A moderate acreage is used for pasture or hay.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, red clover, and lespedeza. The major limitations to pasture and hayland are droughtiness because of depth to soft bedrock, very rapid surface runoff, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 280 board feet on north-facing slopes and 250 board feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are mixed hardwoods, shortleaf pine, Virginia pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, permeability, difficulty in reclaiming the area, clayey subsoil, and low strength. Depth to bedrock and slope limit use of the soil as sites for sewage lagoons. Depth to bedrock, slope, and clayey subsoil limit its use as sites for trench type sanitary landfills. Difficulty in reclaiming the area and clayey subsoil limit use of the soil as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Slope limits its use as sites for shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Low strength and slope limit its use for local roads and streets. Difficulty in reclaiming the area and low strength limit use of the soil as roadfill. Depth to bedrock, permeability, and slope limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IVe.

**28B—State fine sandy loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on low terraces adjacent to flood plains of streams in both the Piedmont and the Blue Ridge regions. Slopes are smooth and commonly complex. Areas of the soil are long and narrow, or irregular in shape. They range from 4 to about 30 acres in size.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 28 inches thick. It is strong brown loam to a depth of 15 inches, brown clay loam to a depth of 32 inches, and brown sandy clay loam to a depth of 39 inches. The substratum is dark yellowish brown sandy loam to a depth of 45 inches and multicolored, very gravelly sand to a depth of 72 inches.

Included with this soil in mapping are small areas of Altavista, Chewacla, and Toccoa soils and soils that are similar to the State soil but that are redder in the subsoil than the State soil. Also included in mapping are small wet areas, small areas of soils that have gravel or cobbles on the surface, and small areas of soils that have slopes of 0 to 2 percent or 7 to 15 percent. The included areas make up as much as 15 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 72 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 48 to 72 inches
*Flooding:* Rare

A large acreage is used for pasture or hay. A moderate acreage is used for cultivated crops. A small acreage is woodland. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, and small grains. Erosion is medium, and is a management concern. In some years the seasonal high water table occasionally interferes with land preparation and planting in spring or harvesting crops in fall. In some years the seasonal high water table restricts rooting depth of some crops. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. In some areas near the mountains in the northern part of the county, considerable amounts of gravel or cobbles in the surface layer interfere with cultivation. If the soil is cultivated, conservation tillage, contour tillage, no-tillage, cover crops, lime and fertilizer, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as orchardgrass, tall fescue, midland bermudagrass, red clover, ladino clover, and lespedeza (fig. 11). The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, restricted grazing when the soil is wet, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is very high. Estimated average annual production of wood per acre is 140 cubic feet. The soil is easily managed for woodland. The common trees are loblolly pine, Virginia pine, shortleaf pine, yellow-poplar, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production.

The main limitations of this soil for most urban uses are flooding, seepage, the seasonal high water table, clayey subsoil, the thin layer of suitable soil material, cutbanks caving in, slope, and low strength. Flooding limits use of the soil as sites for small commercial buildings and dwellings with or without basements. Seepage and flooding limit its use as sites for sewage lagoons. Seepage and the seasonal high water table limit its use as sites for trench type sanitary landfills. There are no limitations to its use for lawns and landscaping and as roadfill. The clayey subsoil and the thin layer of suitable soil material limit its use as daily cover for sanitary landfills. Cutbanks caving in limit its use as sites for shallow excavations. Low strength and flooding limit its use for local roads and streets. Flooding and the seasonal high water table limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**29D—Sweetapple fine sandy loam, 15 to 25 percent slopes.** This is a moderately deep, somewhat excessively drained, moderately steep soil on the side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are irregular in shape and range from 4 to more than 20 acres in size.

Typically, the surface layer is about 5 inches thick. In the uppermost 2 inches it is very dark grayish brown fine sandy loam. Below that, it is dark brown fine sandy loam. The subsoil is about 12 inches thick. It is dark yellowish brown fine sandy loam to a depth of 11 inches and yellowish brown fine sandy loam to a depth of 17 inches. The substratum extends to a depth of 39 inches. It is multicolored saprolite of interbedded mica gneiss and mica schist that crushes to loamy coarse sand.

Figure 11.—Holstein dairy cows graze a pasture of tall fescue and white clover on State fine sandy loam, 2 to 7 percent slopes.

Weathered bedrock extends to a depth of 65 inches. It is multicolored, interbedded mica gneiss and mica schist that crushes to loamy coarse sand. Hard, multicolored mica gneiss bedrock is at a depth of 65 inches.

Included with this soil in mapping are small areas of Grover, Madison, Poindexter, and Wateree soils. Also included in mapping are small areas of soils that have slopes of more than 25 percent. Also included are small gullied areas and small areas of soils that have gravel, cobbles, stones, or rock outcrops on the surface. The included areas make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A small acreage is used for pasture.

This soil is not suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains, mainly because of droughtiness. Erosion potential is high. This soil is droughty because of depth to moderately hard, weathered bedrock and the coarse texture of the surface layer and the subsoil.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, white clover, birdsfoot trefoil, and lespedeza. It is not suited to hay. The major limitations to pasture and hayland are slope, droughtiness, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine is high on north-facing slopes and moderately high on south-facing slopes. Estimated average annual production of wood per acre is 95 cubic feet on north-facing slopes and 75 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, seepage, and difficulty in reclaiming the area. Slope, seepage, and depth to bedrock limit use of the soil as sites for sewage lagoons and trench type sanitary landfills. Difficulty in reclaiming the area and slope limit its use as daily cover for sanitary landfills. Slope limits its use as sites for shallow excavations, dwellings with or without basements, and small commercial buildings, for local roads and streets, and for lawns and landscaping. Difficulty in reclaiming the area limits its use as roadfill. Slope and depth to bedrock limit its use as sites for septic tank absorption fields.

This soil is in capability subclass VIe.

**29E—Sweetapple fine sandy loam, 25 to 60 percent slopes.** This is a moderately deep, somewhat excessively drained, steep and very steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soils are long and narrow in shape. They range from 4 to more than 20 acres in size.

Typically, the surface layer is about 5 inches thick. In the uppermost 2 inches it is very dark grayish brown fine sandy loam. Below that, it is dark brown fine sandy loam. The subsoil is about 12 inches thick. It is dark yellowish brown fine sandy loam to a depth of 11 inches and yellowish brown fine sandy loam to a depth of 17 inches. The substratum extends to a depth of 39 inches. It is multicolored saprolite of interbedded mica gneiss and mica schist that crushes to loamy coarse sand. Weathered bedrock extends to a depth of 65 inches. It is multicolored, interbedded mica gneiss and mica schist that crushes to loamy coarse sand. Hard, multicolored mica gneiss bedrock is at a depth of 65 inches.

Included with this soil in mapping are small areas of Grover, Madison, Poindexter, and Wateree soils. Also included in mapping are small areas of soils that have slopes of 15 to 25 percent or more than 60 percent. Also included are small gullied areas and small areas of soils that have cobbles, stones, and rock outcrops on the surface. The included areas make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low or moderate
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* 20 to 40 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All the acreage of this soil is woodland.

This soil is not suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains, mainly because of droughtiness and slope. Erosion potential is high.

This soil is not suited to pasture and hay plants, such as tall fescue, bermudagrass, white clover, birdsfoot trefoil, and lespedeza. The major limitations to pasture and hayland are slope, droughtiness, acidity, and low natural fertility. These limitations prevent the application of pasture management practices, such as seeding, applying lime and fertilizer, and weed control.

Potential productivity for loblolly pine is high on north-facing slopes and moderately high on south-facing slopes. Estimated average annual production of wood per acre is 95 cubic feet on north-facing slopes and 75 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, seepage, and difficulty in reclaiming the area. Slope, seepage, and depth to bedrock limit use of the soil as sites for sewage lagoons and trench type sanitary landfills. Difficulty in reclaiming the area and slope limit use of the soil as daily cover for sanitary landfills and as roadfill. Slope limits its use as sites for shallow excavations, dwellings with or without basements, and small commercial buildings, for local roads and streets, and for lawns and landscaping. Slope and depth to bedrock limit its use as sites for septic tank absorption fields.

This soil is in capability subclass VIIe.

**30B—Tatum gravelly loam, 2 to 7 percent slopes.** This is a deep, well drained, gently sloping soil on narrow to broad, convex rises on Piedmont uplands.

Slopes are smooth. Areas of the soil are commonly irregular in shape. They range from 4 to more than 400 acres in size.

Typically, the surface layer is brown gravelly loam about 1 inch thick. The subsurface layer is light yellowish brown gravelly loam to a depth of about 6 inches. The subsoil is about 37 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 38 inches, and red channery clay loam to a depth of 43 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered sericite schist that crushes to silt loam. Hard, sericite schist bedrock is at a depth of 72 inches.

Included with this soil in mapping are small areas of Nason soils. Also included are small areas of soils that are similar to the Tatum soil but that are less than 40 inches deep over bedrock and small areas of soils that have slopes of 7 to 15 percent. Also included are small areas of severely eroded soils, small areas of soils where cobbles are on the surface, and areas of rock outcrops. The included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage is woodland. A small acreage is used for cultivated crops, pasture, and hay.

This soil is well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. The gravel in the surface layer interferes with tillage and makes the soil somewhat droughty. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crop response to lime and fertilizer is limited by the lack of moisture. A major problem is establishing and maintaining the proper soil reaction. If the soil is cultivated, conservation tillage, contour tillage, grassed waterways, contour stripcropping, terraces, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to increase water infiltration, to reduce runoff, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The main limitations are the gravelly surface layer, acidity, and low natural fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are depth to bedrock, moderately permeable subsoil, clayey subsoil, seepage, low strength, shrinking and swelling, small stones, and slope. Clayey subsoil and depth to bedrock limit use of the soil as sites for trench type sanitary landfills. Seepage, depth to bedrock, and slope limit its use as sites for sewage lagoons. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The clayey subsoil limits its use as sites for shallow excavations. Shrinking and swelling limits its use as sites for dwellings with or without basements. Shrinking and swelling and slope limit its use as sites for small commercial buildings. Low strength limits its use as roadfill and for local roads and streets. Small stones limit its use for lawns and landscaping. Depth to bedrock and moderately permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**30C—Tatum gravelly loam, 7 to 15 percent slopes.** This is a deep, well drained, strongly sloping soil on the narrow to broad side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are irregular in shape or long, narrow, and winding. They range from 4 to more than 1,200 acres in size.

Typically, the surface layer is brown gravelly loam about 1 inch thick. The subsurface layer is light yellowish brown gravelly loam to a depth of about 6 inches. The subsoil is about 37 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 38 inches, and red channery clay loam to a depth of 43 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered sericite schist that crushes to silt loam. Hard, sericite schist bedrock is at a depth of 72 inches.

Included with this soil in mapping are small areas of Nason soils. Also included are small areas of soils that are similar to the Tatum soil but that are less than 40 inches deep over bedrock. Also included are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have cobbles or rock outcrops on the surface. The included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A very small acreage is used for cultivated crops. A very small acreage is used for pasture or hay.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is medium, and is a management concern. The gravel in the surface layer impedes tillage and makes the soil somewhat droughty. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crop response to lime and fertilizer is limited by the lack of moisture. A major problem is establishing and maintaining the proper soil reaction. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are the gravelly surface layer, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is high. Estimated average annual production of wood per acre is 110 board feet. The soil is easily managed for woodland. There are no major woodland management problems. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, depth to bedrock, moderately permeable subsoil, clayey subsoil, shrinking and swelling, gravel, and low strength. The clayey subsoil and depth to bedrock limit use of the soil as sites for trench type sanitary landfills. Slope limits its use as sites for sewage lagoons and small commercial buildings. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Slope and clayey subsoil limit its use as sites for shallow excavations. Slope and shrinking and swelling limit its use as sites for dwellings with or without basements. Slope and small stones limit its use for lawns and landscaping. Low strength limits its use for local roads and streets and as roadfill. Depth to bedrock, moderately permeable subsoil, and slope limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**30D—Tatum gravelly loam, 15 to 25 percent slopes.** This is a deep, well drained, moderately steep soil on side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are commonly narrow, long, and winding. They range from 4 to more than 75 acres in size.

Typically, the surface layer is brown gravelly loam about 1 inch thick. The subsurface layer is light yellowish brown gravelly loam to a depth of about 6 inches. The subsoil is about 37 inches thick. It is yellowish red clay loam to a depth of 9 inches, red clay to a depth of 38 inches, and red channery clay loam to a depth of 43 inches. The substratum extends to a depth of 72 inches. It is multicolored, weathered sericite schist that crushes to silt loam. Hard, sericite schist bedrock is at a depth of 72 inches.

Included with this soil in mapping are small areas of Manteo and Nason soils. Also included are small areas of soils that are similar to the Tatum soil but that are less than 40 inches deep over bedrock and small areas of soils that have slopes of more than 25 percent. Also included are small gullied areas, small areas of severely eroded soils, and small areas of soils that have cobbles or rock outcrops on the surface. The included areas make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Most of the acreage of this soil is woodland. A very small acreage is used for pasture or hay.

This soil is poorly suited to cultivated crops, such as corn, corn silage, dark tobacco, and small grains. Erosion potential is high, and is a management concern. The gravel in the surface layer impedes tillage and makes the soil somewhat droughty.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are slope, the gravelly surface layer, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet on north-facing slopes and 90 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitation of this soil for most urban uses are slope, clayey subsoil, depth to bedrock, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, shallow excavations, dwellings with or without basements, and small commercial buildings, and for lawns and landscaping. Slope, clayey subsoil, and depth to bedrock limit its use as sites for trench type sanitary landfills. The clayey subsoil and slope limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Slope and low strength limit its use for local roads and streets. Low strength limits its use as roadfill.

This soil is in capability subclass IVe.

**31B—Thurmont fine sandy loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on narrow convex ridgetops commonly near the base of the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly irregular in shape. They range from 4 to about 60 acres in size.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 42 inches thick. It is strong brown sandy clay loam to a depth of 16 inches and strong brown clay loam to a depth of 34 inches. Below that, it is mottled, dominantly strong brown clay loam to a depth of 44 inches and mottled, dominantly brown gravelly sandy clay loam to a depth of 53 inches. The substratum is mottled, yellowish brown very gravelly sandy loam to a depth of 72 inches.

Included with this soil in mapping are small areas of Braddock, Hayesville, Sequoia, and State soils and soils that are similar to the Thurmont soil but that have a thick, darker colored surface layer, have gray mottles in the upper part of the subsoil, or have more clay in the subsoil than is typical for the Thurmont soil. Also included in mapping are small areas of soils that have slopes of more than 7 percent and areas of soils that have gravel, cobbles, or stones on the surface. The included soils make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 48 to 72 inches
*Flooding:* None

A large acreage of this soil is used for hay or pasture. A moderate acreage is used for cultivated crops. A small acreage is woodland. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. In some areas gravel, cobbles, or stones in the surface layer impede tillage. Crops respond to lime and fertilizer applied to this soil. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is well suited to pasture plants and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, ladino clover, red clover, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 280 board feet. The soil is easily managed for woodland. The major woodland management problem is plant competition. The common trees are mixed hardwoods, loblolly pine, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Installing logging roads and skid trails on the contour and seeding them with grasses help to control erosion. Harvesting during dry seasons helps to reduce rutting of skid trails.

The major limitations of this soil for most urban uses are slope, the seasonal high water table, moderately permeable subsoil, seepage, potential frost action, and small stones. Slope, seepage, and the seasonal high water table limit use of the soil as sites for sewage lagoons. The seasonal high water table limits its use as sites for trench type sanitary landfills, shallow excavations, and dwellings with basements. Small stones limit its use as daily cover for sanitary landfills. There are no significant limitations of the soil as sites for dwellings without basements, for lawns and landscaping, and as roadfill. Slope limits its use as sites for small commercial buildings. Frost action limits its use for local roads and streets. The seasonal high water table and moderately permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**31C—Thurmont fine sandy loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on the broad to narrow, convex foot slopes of mountains, on ridgetops, and on the sides of ridges commonly near the base of mountains in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly irregular in shape. They range from 4 to about 30 acres in size.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 42 inches thick. It is strong brown sandy clay loam to a depth of 16 inches and strong brown clay loam to a depth of 34 inches. Below that, it is mottled, dominantly strong brown clay loam to a depth of 44 inches and mottled, dominantly brown gravelly sandy clay loam to a depth of 53 inches. The substratum is mottled, yellowish brown very gravelly sandy loam to a depth of 72 inches.

Included with this soil in mapping are small areas of Braddock, Edneytown, Hayesville, Sequoia, and State soils and soils that are similar to the Thurmont soil but that have a thick, darker colored surface layer, have gray mottles in the upper part of the subsoil, or have more clay in the subsoil than is typical for the Thurmont soil. Also included in mapping are small areas of soils that have slopes of less than 7 percent or more than 15 percent and areas of soils that have gravel, cobbles, or stones on the surface. These included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 48 to 72 inches
*Flooding:* None

A small acreage is used for cultivated crops. A large acreage is used for hay or pasture. A moderate acreage is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Gravel, cobbles, or stones in the surface layer in some areas impede tillage. Crops respond to lime and fertilizer applied to this soil. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is moderately high. Estimated average annual production of wood per acre is 280 board feet. The soil is easily managed for woodland. The major woodland management problem is plant competition. The common grown trees are mixed hardwoods, loblolly pine, Virginia pine, and shortleaf pine. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Installing logging roads and skid trails on the contour and seeding them with grasses help to control erosion. Harvesting during dry seasons helps to reduce rutting on skid trails.

The major limitations of this soil for most urban uses are the seasonal high water table, slope, small stones, potential frost action, and moderately permeable subsoil. Slope limits use of the soil as sites for sewage lagoons, dwellings without basements, and small commercial buildings, and for lawns and landscaping. Slope and the seasonal high water table limit its use as sites for shallow excavations and dwellings with basements. Small stones and slope limit its use as daily cover for sanitary landfills. The seasonal high water table limits its use as sites for trench type sanitary landfills. Slope and potential frost action limit its use for local roads and streets. There are no significant limitations to use of the soil as roadfill. The seasonal high water table, moderately permeable subsoil, and slope limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**31D—Thurmont fine sandy loam, 15 to 25 percent slopes.** This is a very deep, well drained, moderately steep soil commonly on the broad to narrow, convex foot slopes of mountains and on the sides of ridges commonly near the base of mountains in the Blue Ridge Mountains. Slopes are smooth and commonly complex. Areas of the soil are commonly irregular in shape. They range from 4 to about 150 acres in size.

Typically, the surface layer is brown fine sandy loam about 11 inches thick. The subsoil is about 42 inches thick. It is strong brown sandy clay loam to a depth of 16 inches and strong brown clay loam to a depth of 34 inches. Below that, it is mottled, dominantly strong brown clay loam to a depth of 44 inches and mottled, dominantly brown gravelly sandy clay loam to a depth of 53 inches. The substratum is mottled, yellowish brown very gravelly sandy loam to a depth of 72 inches.

Included with this soil in mapping are small areas of Braddock, Edneytown, Hayesville, and Sequoia soils and soils that are similar to the Thurmont soil but that have a thick, dark colored surface layer, have gray mottles in the upper part of the subsoil, or have more clay in the subsoil. Also included in mapping are small areas of soils that have slopes of less than 15 percent or more than 25 percent and areas of soils that have gravel, cobbles, or stones on the surface. The included soils make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 48 to 72 inches
*Flooding:* None

A large acreage of this soil is woodland. A small acreage is used for hay and pasture. A very small acreage is used for cultivated crops.

This soil is poorly suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Gravel, cobbles, and stones in the surface layer in some areas impede tillage. Crops respond to lime and fertilizer applied to this soil. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, orchardgrass, bermudagrass, midland bermudagrass, white clover, ladino clover, and lespedeza. The major limitations to pasture and hayland are slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak is moderately high on north-facing slopes and moderate on south-facing slopes. Estimated average annual production of wood per acre is 280 board feet on north-facing slopes and 250 board feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, seedling mortality on south-facing slopes, and plant competition. The common trees are mixed hardwoods, Virginia pine, shortleaf pine, and loblolly pine. Thinning stands for rapid growth, selective cutting, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Installing logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The major limitations of this soil for most urban uses are slope and the seasonal high water table. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, daily cover for sanitary landfills, shallow excavations, dwellings with or without basements, and small commercial buildings, for local roads and streets, for lawns and landscaping, and as roadfill. Slope and the seasonal high water table limit its use as sites for trench type sanitary landfills.

This soil is in capability subclass IVe.

**32A—Toccoa sandy loam, 0 to 2 percent slopes.** This is a very deep, well drained, nearly level soil on flood plains of creeks and rivers. The soil is commonly adjacent to the stream channel. Slopes are smooth. Areas of the soil are commonly long, narrow, and winding. They range from 4 to more than 200 acres in size. The soil is subject to frequent flooding.

Typically, the surface layer is about 7 inches thick. In the uppermost 2 inches it is dark brown sandy loam, and below that it is reddish brown sandy loam. The substratum is reddish brown sandy loam to a depth of 60 inches and reddish brown mottled loam to a depth of 72 inches or more.

Included with this soil in mapping are small areas of Chewacla soils and soils that are similar to the Toccoa soil but that have more clay or have gray mottles nearer the surface. Also included are small areas of wet soils, sandy soils, gravelly soils, and cobbly soils. The included soils make up as much as 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Moderate
*Surface runoff:* Slow
*Erosion potential:* Low
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Medium
*Soil reaction:* Strongly acid to slightly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* 30 to 60 inches
*Flooding:* Frequent and brief

Some areas of this soil are used for pasture and hay. Some areas are woodland. A small acreage is used for cultivated crops. This is a prime farmland soil where protected from flooding or where not subject to frequent flooding during the growing season.

This soil is moderately well suited to cultivated crops, such as corn and corn silage. In some years frequent flooding or above normal rainfall delays spring planting, causes crop damage, or interferes with fall harvest. During prolonged periods of below normal rainfall in some areas the soil is somewhat droughty because of moderate available water capacity. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. In some areas gravel and cobbles in the surface layer interfere with tillage. If the soil is cultivated, conservation tillage, cover crops, grasses and legumes included in the cropping system, and crop residue returned to the soil help to maintain organic matter content and soil tilth, to increase water infiltration, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, white clover, and ladino clover. The major limitations are flooding, the seasonal high water table, acidity, and medium natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, weed control, and restricted grazing during wet seasons help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is very high. Estimated average annual production of wood per acre is 130 cubic feet. The soil is easily managed for woodland. The only major woodland management problem is plant competition. The common trees are loblolly pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production.

The main limitations of this soil for most urban uses are flooding, the seasonal high water table, and seepage. Flooding limits use of the soil as sites for dwellings with or without basements and small commercial buildings, for local roads and streets, and for lawns and landscaping. Flooding and the seasonal high water table limit its use as sites for septic tank absorption fields and for shallow excavations. Flooding, the seasonal high water table, and seepage limit its use as sites for sewage lagoons and trench type sanitary landfills. There are no major limitations to use of the soil as roadfill and as daily cover for sanitary landfills.

This soil is in capability subclass IIIw.

**33B—Turbeville fine sandy loam, 2 to 7 percent slopes.** This is a very deep, well drained, gently sloping soil on the broad rises of Piedmont uplands. Slopes are smooth. Areas of the soil are irregularly shaped. They range from 4 to about 50 acres in size.

Typically, the surface layer is brown fine sandy loam about 9 inches thick. The subsoil is 63 inches thick or more. It is yellowish red clay loam to a depth of 12 inches and red clay to a depth of 24 inches. Below that, to a depth of 72 inches, it is dark red clay that has mottles in the lower part.

Included with this soil in mapping are small areas of Cecil, Cullen, Madison, and Mattaponi soils and soils that are similar to the Turbeville soil but that have a darker colored surface layer. Also included are small areas of soils that have slopes of 0 to 2 percent or more than 7 percent, small eroded spots, and small areas of soils that have gravel and cobbles on the surface. The included areas make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage of this soil is used for cultivated crops. A moderate acreage is used for pasture and hay. A small acreage is woodland. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, small grains, and flue-cured tobacco. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, grassed waterways, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to increase water infiltration, to reduce runoff, to control erosion, and to increase productivity.

This soil is well suited to pasture and hay plants, such as orchardgrass, tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, red clover, lespedeza, and alfalfa. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet. The soil is easily managed for woodland use. The major woodland management problem is plant competition. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Installing logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are moderately permeable subsoil, slope, clayey subsoil, shrinking and swelling, and low strength. Slope limits use of the soil as sites for sewage lagoons. The clayey subsoil limits its use as sites for trench type sanitary landfills and shallow excavations. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Shrinking and swelling limit its use as sites for dwellings with or without basements. Slope and shrinking and swelling limit its use as sites for small commercial buildings. Low strength limits its use for local roads and streets and as roadfill. There are no limitations to use of the soil for lawns and landscaping. Moderately permeable subsoil limits its use as sites for septic tank absorption fields (fig. 12).

This soil is in capability subclass IIe.

**33C—Turbeville fine sandy loam, 7 to 15 percent slopes.** This is a very deep, well drained, strongly sloping soil on the narrow to broad side slopes of Piedmont uplands. Slopes are smooth. Areas of the soil are long, narrow, and winding or are irregular in shape. They range from 4 to about 20 acres in size.

Typically, the surface layer is brown fine sandy loam about 9 inches thick. The subsoil is 63 inches thick or more. It is yellowish red clay loam to a depth of 12 inches and red clay to a depth of 24 inches. Below that, to a depth of 72 inches, it is dark red clay that has mottles in the lower part.

Included with this soil in mapping are small areas of Cecil, Cullen, Madison, and Mattaponi soils and soils that are similar to the Turbeville soil but that have a darker

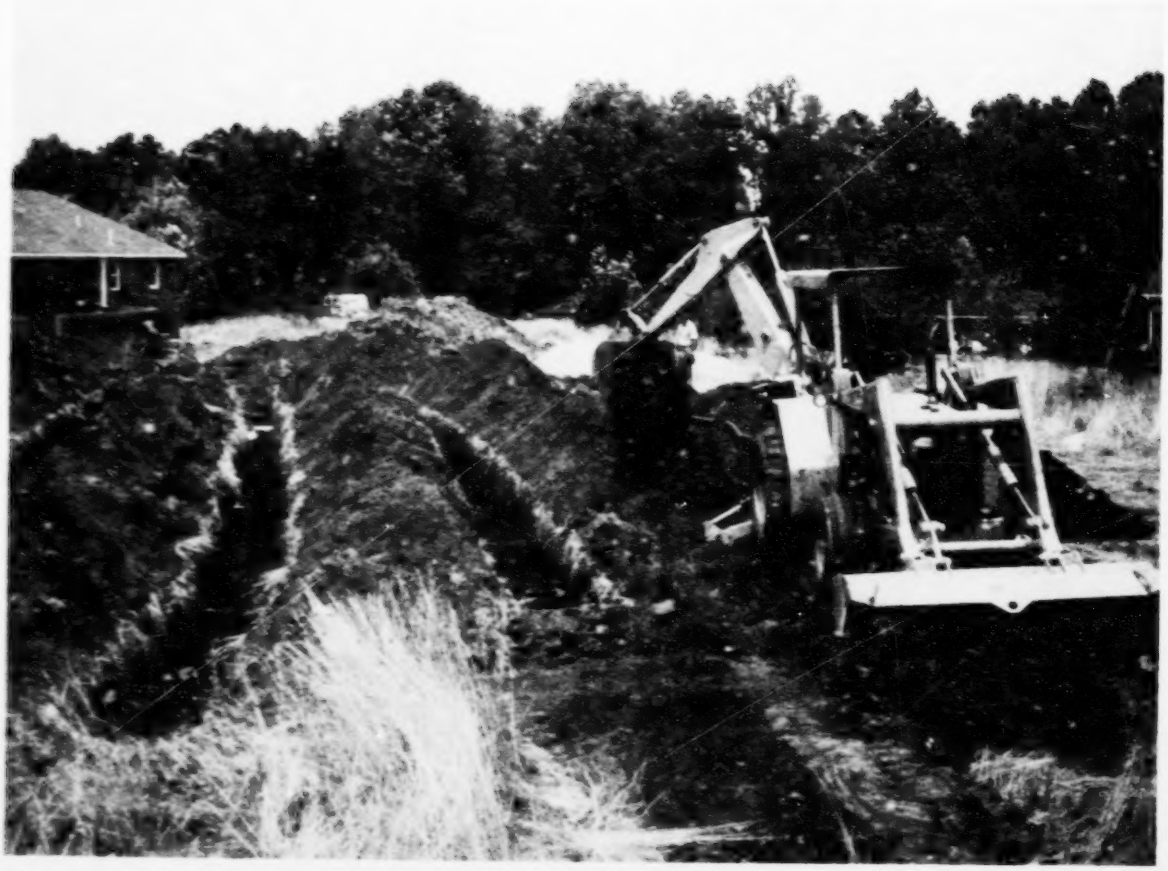


**Figure 12.—The installation of a septic tank absorption field on Turbeville fine sandy loam, 2 to 7 percent slopes.**

colored surface layer. Also included are small areas of soils that have slopes of 2 to 7 percent or more than 15 percent, small areas that have gravel or cobbles on the surface, and small areas of severely eroded soils. The included soils make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage is used for cultivated crops. A moderate acreage is used for pasture or hay. A small acreage is woodland.

This soil is moderately well suited to cultivated crops, such as corn, corn silage, small grains, and flue-cured tobacco. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond well to lime and fertilizer applied to the soil. If the soil is cultivated, conservation tillage, contour tillage, grassed waterways, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to increase water infiltration, to reduce runoff, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, red clover, lespedeza, and alfalfa. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for northern red oak on this soil is high. Estimated average annual production of wood per acre is 110 board feet. The soil is easily managed for woodland. The major woodland management problem is plant competition. The common trees are mixed hardwoods, shortleaf pine, Virginia pine, and loblolly pine. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Installing logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are moderately permeable subsoil, slope, clayey subsoil, shrinking and swelling, and low strength. Slope limits use of the soil as sites for sewage lagoons and small commercial buildings and for lawns and landscaping. The clayey subsoil limits its use as sites for trench type sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. The clayey subsoil and slope limit its use as sites for shallow excavations. Shrinking and swelling and slope limit its use as sites for dwellings with or without basements. Low strength limits its use for local roads and streets and as roadfill. Slope and moderately permeable subsoil limit its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**33D—Turbeville fine sandy loam, 15 to 25 percent slopes.** This is a very deep, well drained, moderately steep soil on side slopes of Piedmont uplands and on foot slopes of the adjacent mountains. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or are irregular in shape. They range from 4 to about 20 acres in size.

Typically, the surface layer is brown fine sandy loam about 9 inches thick. The subsoil is 63 inches thick or more. It is yellowish red clay loam to a depth of 12 inches and red clay to a depth of 24 inches. Below that, to a depth of 72 inches, it is dark red clay that has mottles in the lower part.

Included with this soil in mapping are small areas of Cecil, Cullen, and Madison soils and soils that are similar to the Turbeville soil but that have a darker colored surface layer. Also included are areas of soils that have a darker colored surface layer, small areas of soils that have slopes of 7 to 15 percent or more than 25 percent, small areas that have gravel or cobbles on the surface, small gullied areas, and small spots of severely eroded soils. The included areas make up about 30 percent of some mapped areas.

Soil properties:

*Permeability:* Moderate
*Available water capacity:* Moderate
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Good
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A moderate acreage of this soil is used for pasture or hay. A moderate acreage is woodland. A very small acreage is used for cultivated crops.

This soil is poorly suited to cultivated crops, such as corn, corn silage, small grains, and flue-cured tobacco. Erosion potential is high, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer. If the soil is cultivated, conservation tillage, contour tillage, grassed waterways, contour stripcropping, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to increase water infiltration, to reduce runoff, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as orchardgrass, tall fescue, bermudagrass, midland bermudagrass, white clover, ladino clover, red clover, and lespedeza. The major limitations to pasture and hayland are slope, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 110 cubic feet on north-facing slopes and 90 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitations, plant competition, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are slope, clayey subsoil, and low strength. Slope limits use of the soil as sites for septic tank absorption fields, sewage lagoons, shallow excavations, small commercial buildings, and dwellings with or without basements, and for lawns and landscaping. Slope and low strength limit its use for local roads and streets. Slope and clayey subsoil limit its use as sites for trench type sanitary landfills. Slope and clayey subsoil limit its use as daily cover for sanitary landfills; the clay content makes the soil hard to pack. Low strength limits its use as roadfill.

This soil is in capability subclass IVe.

**34B—Vance fine sandy loam, 2 to 7 percent slopes.** This is a deep, well drained, gently sloping soil on the narrow to broad rises of Piedmont uplands. Slopes are smooth. Areas of the soil are commonly irregular in shape. They range from 4 to about 10 acres in size.

Typically, the surface layer of this soil is grayish brown fine sandy loam about 2 inches thick. The subsurface layer is light yellowish brown fine sandy loam to a depth of about 12 inches. The subsoil is about 35 inches thick. It is yellowish brown sandy clay loam to a depth of 17 inches. Below that, it is strong brown clay to a depth of 24 inches and yellowish brown clay to a depth of 40 inches. The substratum, to a depth of 53 inches, is multicolored granite gneiss that crushes to sandy clay loam. Below that, to a depth of 72 inches, it is multicolored granite gneiss and mica gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Cecil, Helena, Madison, and Mattaponi soils and soils that are similar to the Vance soil but that have a moderately permeable clay subsoil or have gray mottles in the lower part of the subsoil and in the substratum. Also included are small areas of soils that have gravel or cobbles on the surface and small areas of soils that have slopes of 7 to 15 percent. The included soils make up about 20 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Medium
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

A large part of the acreage of this soil is woodland. A small acreage is used for pasture and hay. A small acreage is used for cultivated crops. This is a prime farmland soil.

This soil is well suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer applied to the soil. During periods of prolonged heavy rainfall, in some areas the slow permeability of the subsoil drowns some crops, such as flue-cured tobacco. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, terraces, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, midland bermudagrass, white clover, ladino clover, and lespedeza. It is not well suited to alfalfa. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to reduce acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 100 cubic feet. The soil is easily managed for woodland. There are no major woodland management problems. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses helps to control erosion.

The main limitations of this soil for urban uses are slope, slowly permeable subsoil, low strength, clayey subsoil, and shrinking and swelling. Low strength limits use of the soil for local roads and streets and as roadfill. Clayey subsoil limits its use as sites for shallow excavations and trench type sanitary landfills. Slope limits its use as sites for sewage lagoons. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Shrinking and swelling limits its use as sites for dwellings with or without basements. Shrinking and swelling and slope limit its use as sites for small commercial buildings. There are no limitations of the soil for lawns and landscaping. Slowly permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIe.

**34C—Vance fine sandy loam, 7 to 15 percent slopes.** This is a deep, well drained, strongly sloping soil on some narrow to broad side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil are long, narrow, and winding, or irregular in shape. They range from 4 to about 10 acres in size.

Typically, the surface layer is grayish brown fine sandy loam about 2 inches thick. The subsurface layer is light yellowish brown fine sandy loam to a depth of about 12 inches. The subsoil is about 35 inches thick. It is yellowish brown sandy clay loam to a depth of 17 inches. Below that, it is strong brown clay to a depth of 24 inches and yellowish brown clay to a depth of 40 inches. The substratum, to a depth of 53 inches, is multicolored granite gneiss that crushes to sandy clay loam. Below that, to a depth of 72 inches, it is multicolored granite gneiss and mica gneiss that crushes to sandy loam.

Included with this soil in mapping are small areas of Cecil, Helena, Madison, and Mattaponi soils and soils that are similar to the Vance soil but that have a moderately permeable clay subsoil or have gray mottles in the lower part of the subsoil and in the substratum. Also included are small areas of soils that have gravel or cobbles on the surface and small areas of soils that have slopes of less than 7 percent. The included soils make up about 25 percent of some mapped areas.

Soil properties:

*Permeability:* Slow
*Available water capacity:* Moderate
*Surface runoff:* Rapid
*Erosion potential:* Medium
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low
*Soil reaction:* Very strongly acid or strongly acid
*Depth to bedrock:* More than 60 inches
*Shrink-swell potential:* Moderate
*Depth to high water table:* More than 72 inches
*Flooding:* None

Much of the acreage of this soil is woodland. A small acreage is used for pasture or hay. A very small acreage of this soil is used for cultivated crops.

This soil is poorly suited to cultivated crops, such as corn, corn silage, flue-cured tobacco, and small grains. Erosion potential is medium, and is a management concern. Incorporating organic matter into the soil and plowing the soil at the proper moisture content maintain or improve tilth. Crops respond to lime and fertilizer applied to this soil. During periods of prolonged heavy rainfall in some areas slow permeability of the subsoil drowns some crops, such as flue-cured tobacco. If the soil is cultivated, conservation tillage, contour tillage, contour stripcropping, grassed waterways, cover crops, and grasses and legumes included in the cropping system help to maintain soil tilth, to reduce runoff, to increase water infiltration, to control erosion, and to increase productivity.

This soil is moderately well suited to pasture and hay plants, such as tall fescue, midland bermudagrass, white clover, ladino clover, and lespedeza. It is not well suited to alfalfa. The major limitations to pasture and hayland are acidity and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 100 cubic feet. The soil is easily managed for woodland. There are no major woodland management problems. The common trees are loblolly pine, Virginia pine, shortleaf pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, selective cutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for many urban uses are slope, slowly permeable subsoil, low strength, clayey subsoil, and shrinking and swelling. Low strength limits use of the soil for local roads and streets and as roadfill. The clayey subsoil limits its use as sites for trench type sanitary landfills. Slope limits its use as sites for sewage lagoons and small commercial buildings and for lawns and landscaping. Clayey subsoil and slope limit its use as daily cover for sanitary landfills. The clay content makes the soil hard to pack if used as daily cover for sanitary landfills. Clayey subsoil and slope limit its use as sites for shallow excavations. Shrinking and swelling and slope limit its use as sites for dwellings with or without basements. The slowly permeable subsoil limits its use as sites for septic tank absorption fields.

This soil is in capability subclass IIIe.

**35D—Wateree fine sandy loam, 15 to 25 percent slopes.** This is a moderately deep, excessively drained, moderately steep soil on the narrow side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil commonly follow the sides of ridges and are commonly long, narrow, and winding. They range from 4 to 30 acres in size.

Typically, the surface layer is about 6 inches thick. In the uppermost 2 inches it is dark grayish brown fine sandy loam. Below that, it is brown fine sandy loam. The subsoil is yellowish brown sandy loam about 13 inches thick. The substratum, to a depth of 39 inches, is multicolored saprolite of granite gneiss that crushes to sandy loam, and, to a depth of 59 inches, is multicolored, partly weathered granite gneiss that crushes to sandy loam. Hard, granite gneiss bedrock is at a depth of 59 inches.

Included with this soil in mapping are small areas of Grover, Madison, Poindexter, and Sweetapple soils. Also included are small areas of soils that have slopes of more than 25 percent, small areas of severely eroded soils, and small gullied areas. Also included are small areas of soils that have a gravelly surface layer, and small areas that have granite gneiss rock outcrops, cobbles, or stones on the surface. The included areas make up as much as 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, white clover, birdsfoot trefoil, and lespedeza. It is not suited to hay. The major limitations to pasture are slope, droughtiness, low available water capacity, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 105 cubic feet on north-facing slopes and 80 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are loblolly pine, Virginia pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil for most urban uses are slope, seepage, depth to bedrock, the thin layer of suitable soil material, and cutbanks caving in. Slope, depth to bedrock, and seepage limit use of the soil as sites for sewage lagoons and trench type sanitary landfills. Slope and the thin layer of suitable soil material limit use of the soil as daily cover for sanitary landfills. Cutbanks caving in and slope limit its use as sites for shallow excavations. The thin layer of suitable soil material limits use of the soil as roadfill. Slope limits its use as sites for dwellings with or without basements, small commercial buildings, and septic tank absorption fields, for local roads and streets, and for lawns and landscaping.

This soil is in capability subclass VIe.

**35E—Wateree fine sandy loam, 25 to 40 percent slopes.** This is a moderately deep, excessively drained, steep soil on the narrow side slopes of Piedmont uplands. Slopes are smooth and commonly complex. Areas of the soil commonly follow the sides of ridges and are commonly long, narrow, and winding. They range from 4 to about 25 acres in size.

Typically, the surface layer is about 6 inches thick. In the uppermost 2 inches it is dark grayish brown fine sandy loam. Below that, it is brown fine sandy loam. The subsoil is yellowish brown sandy loam about 13 inches thick. The substratum, to a depth of 39 inches, is multicolored saprolite of granite gneiss that crushes to sandy loam, and, to a depth of 59 inches, is multicolored partly weathered granite gneiss that crushes to sandy loam. Hard, granite gneiss bedrock is at a depth of 59 inches.

Included with this soil in mapping are small areas of Grover, Madison, Poindexter, and Sweetapple soils. Also included are small areas of soils that have slopes of less than 25 percent or more than 40 percent and small areas of severely eroded soils. Also included are small gullied areas, small areas of soils that have a gravelly surface layer, and small areas that have granite gneiss rock outcrops, cobbles, or stones on the surface. The included areas make up as much as 25 percent of some mapped areas.

Soil properties:

*Permeability:* Moderately rapid
*Available water capacity:* Low
*Surface runoff:* Very rapid
*Erosion potential:* High
*Tilth:* Fair
*Organic matter content:* Low
*Natural fertility:* Low or medium
*Soil reaction:* Very strongly acid to moderately acid
*Depth to bedrock:* 40 to 60 inches
*Shrink-swell potential:* Low
*Depth to high water table:* More than 72 inches
*Flooding:* None

All the acreage of this soil is woodland.

This soil is not suited to the cultivated crops commonly grown in the county. Erosion potential is high, and is a management concern.

This soil is poorly suited to pasture plants, such as tall fescue, bermudagrass, white clover, birdsfoot trefoil, and lespedeza. It is not suited to hay. The major limitations to pasture are slope, very rapid surface runoff, droughtiness, low available water capacity, acidity, and low natural fertility. Lime and fertilizer help to offset acidity and to increase fertility. Major pasture management concerns are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Stocking rates within carrying capacity, rotational grazing, deferred grazing, and weed control help to maintain desirable grasses and legumes. Lime and fertilizer increase forage production.

Potential productivity for loblolly pine on this soil is high. Estimated average annual production of wood per acre is 105 cubic feet on north-facing slopes and 80 cubic feet on south-facing slopes. Slope limits woodland use and management. Major woodland management problems are the erosion hazard, the equipment limitation, and, on south-facing slopes, seedling mortality. The common trees are Virginia pine, loblolly pine, and mixed hardwoods. Thinning stands for rapid growth, clearcutting, replanting with fast-growing tree species, and removing diseased or insect-infested trees help to increase potential timber production. Laying out logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The main limitations of this soil to most urban uses are slope, seepage, depth to bedrock, the thin layer of suitable soil material, and cutbanks caving in. Slope, depth to bedrock, and seepage limit use of the soil as sites for sewage lagoons and trench type sanitary landfills. The thin layer of suitable soil material and slope limit use of the soil as daily cover for sanitary landfills and as roadfill. Cutbanks caving in and slope limit its use as sites for shallow excavations. Slope limits its use as sites for dwellings with or without basements, small commercial buildings, and septic tank absorption fields, for local roads and streets, and for lawns and landscaping.

This soil is in capability subclass VIIe.

# Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. Identification of prime farmland is a major step in meeting the Nation's needs for food and fiber.

The U.S. Department of Agriculture defines prime farmland as the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to produce a sustained high yield of crops while using acceptable farming methods. Prime farmland produces the highest yields and requires minimal amounts of energy and economic resources, and farming it results in the least damage to the environment.

An area identified as prime farmland must be used for producing food or fiber or must be available for those uses. Thus, urban and built-up land and water areas are not classified as prime farmland.

The general criteria for prime farmland are as follows: a generally adequate and dependable supply of moisture from precipitation or irrigation, favorable temperature and growing-season length, acceptable levels of acidity or alkalinity, few or no rocks, and permeability to air and water. Prime farmland is not excessively erodible, is not saturated with water for long periods, and is not flooded during the growing season. The slope range is mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

The survey area contains about 80,708 acres of prime farmland. That acreage makes up about 17 percent of the total acreage in the survey area and is mainly in the southeastern part of the county.

The soil map units that make up prime farmland in the survey area are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4, and the location of each unit is shown on the detailed soil maps at the back of this publication. The soil properties and characteristics that affect use and management of the units are described in the section "Detailed Soil Map Units."

Some soils in table 5 are classified as prime farmland if certain limitations of the soil are overcome. The measures needed to overcome the limitations of such soils are given in parentheses after the name of the map unit.

# Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

## Crops and Pasture

Alvin B. Guthrie, District Conservationist, Soil Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 52,000 acres of the survey area is in hay and annual crops, and about 77,000 acres is in pasture. A small acreage is in orchards, mainly apples and peaches. According to the 1982 Census of Agriculture, the major crops were alfalfa, corn for grain, corn for silage, wheat, barley, tobacco, and soybeans.

The soils in a large part of the survey area are suited to increased production of cultivated crops. A large increase can come from a sizable acreage that is woodland or is used for hay and pasture. Crop production can also be increased by extending the latest crop production technology to all cropland in the survey area. This soil survey can help to facilitate the application of such technology.

The climate and many of the soils are suited to the crops commonly grown in the survey area. Some of the soils, especially those on the sides of the mountains and ridges, are not suited to crops because of steep slopes and stones on the surface. Hayesville, Braddock, Thurmont, Cecil, Cullen, Turbeville, Mattaponi, and State soils are some of the most productive soils for growing cultivated crops. These soils are also well suited to orchards, vegetables, small fruits, and nursery plants.

Most areas of the less sloping soils in the survey area are well suited to pasture and hay. A large acreage of cleared land is used for pasture and hay because of the large number of both dairy and beef cattle in the survey area.

The dominant pasture plants in the well managed pastures are tall fescue, orchardgrass, and bermudagrass. The main legumes grown with the grasses in some pastures are white clover, ladino clover, and birdsfoot trefoil. Midland bermudagrass is suited in this survey area because it is a hybrid that is cold tolerant and produces large quantities of summer forage if managed properly. Many well managed pastures consist of a mixture of grasses and legumes, mainly tall fescue and white clover.

The dominant hay crops are orchardgrass, alfalfa, and tall fescue. Orchardgrass is the major grass hay crop because it makes better quality hay than tall fescue. The acreage planted to alfalfa has increase significantly. Many of the deep, well drained, gently sloping and strongly sloping soils, such as Cecil, Cullen, Turbeville, Hayesville, and Braddock soils, are well suited to alfalfa if they are properly limed and fertilized.

The latest information and suggestions for growing crops, hay, and pasture can be obtained from the local offices of the Cooperative Extension Service and the Soil Conservation Service.

Most of the soils in the survey area respond very well to applications of nitrate, phosphate, and potash fertilizers. The surface layer of most of the soils are commonly strongly acid and need applications of ground limestone to sufficiently reduce the soil acidity for good crop growth. The amount of lime and fertilizer used on all soils should be based on the results of soil tests, on the needs of the crops, and on the expected yields. The Cooperative Extension Service can help to determine the kind and amount of lime and fertilizer to apply.

Organic matter is an important source of nitrogen for crops. It also helps to increase the water intake rate, to reduce surface crusting, to control erosion, and to maintain or improve soil tilth. On most of the soils used for crops, the surface layer is fine sandy loam or loam.

Most of the soils in the county are low in content of organic matter in the surface layer and generally have weak structure. High intensity rains at times cause surface crusting. This crusted surface is hard when dry and is somewhat impervious to water, especially in spots where plowing has incorporated some of the clay subsoil into the surface layer. When hard and crusted the surface increases surface runoff. Regular additions of livestock manure and other organic material help to improve soil structure and to reduce surface crusting. Leaving crop residue on the surface also helps to reduce surface crusting.

Soil erosion is the major hazard on about 85 percent of the cropland in the survey area. Soil erosion reduces the productivity of the soil. On most of the soils it also significantly reduces the available moisture capacity of the plow layer because cultivation has mixed the clayey subsoil into the plow layer. If the surface layer is lost through erosion, much of the available plant nutrients and most of the organic matter are also lost. Loss of organic matter damages soil structure and soil tilth and reduces water infiltration and available moisture capacity. On soils that have a clayey subsoil, such as Cecil, Cullen, and Hayesville soils, controlling erosion is especially important. If the original, friable surface layer has been eroded away, preparing a good seedbed, tillage, and growing a good stand of some crops are difficult in the remaining clayey spots. Such spots are common in areas of Cecil soils. In many areas, soil erosion on farmland causes pollution of streams by sediments, nutrients, and pesticides. Controlling erosion minimizes such pollution and improves the quality of water for municipal use and for fish and wildlife.

Erosion control practices cover and protect the surface, reduce runoff, and increase water infiltration. A cropping system that keeps plant cover on the soil for extended periods helps to control erosion and to maintain the productive capacity of the soils. Legumes and grass forage crops included in the cropping system help to control erosion on sloping land, provide nitrogen for plants, and improve soil tilth for the following crops.

On cropland, terraces, diversions, contour tillage, grassed waterways, and cropping sysems that rotate grass or close-growing crops with row crops help to control erosion.

On the soils that have short, irregular slopes, a cropping system that provides abundant plant cover helps to control erosion. Leaving crop residue on the surface, either by minimizing tillage or by stubble mulching, helps to increase water infiltration, to reduce runoff, and to control erosion. Crop residue is especially needed to help control erosion during seeding and early crop growth.

On the soils that have smooth, uniform slopes, contour tillage is effective in reducing surface runoff and significantly increases the amount of water that soaks into the soil. Soil moisture is commonly a critical factor at certain times during the growing season. Contour tillage is also very effective in controlling erosion.

Drainage of excess water from the soil is needed on a small percentage of the acreage used for crops and pasture in the survey area. Chewacla soils are naturally so wet that drainage is commonly needed to make them suitable for crop production.

The design of surface and subsurface drainage systems varies with the kind of soil. Drains need to be more closely spaced on the slowly permeable clayey soils than on the more permeable soils. In some areas finding adequate outlets for drainage systems is difficult.

The major limitations of most of the soils used for pasture and hay are acidity and low natural fertility. Applications of lime and fertilizer, especially nitrogen, are needed to offset acidity and to improve soil fertility for maximum forage production.

Major pasture management problems are establishing and maintaining a mixture of grasses and legumes and preventing overgrazing. Overgrazing reduces the stand of desirable grasses and legumes and permits weeds to increase. Overgrazing reduces the cover and increases erosion. Major pasture management concerns are proper stocking rates to maintain desirable grasses and legumes, rotational grazing, deferred grazing, weed control, and applying lime and fertilizer for maximum forage production.

Information on erosion control and drainage practices for each kind of soil can be obtained at the local office of the Soil Conservation Service. Information on management practices for cropland, pastureland, and hayland can be obtained at the local office of the Cooperative Extension Service.

### Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

### Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. The levels are defined in the following paragraphs.

*Capability classes*, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

*Capability subclasses* are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; ***w*** shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

## Woodland Management and Productivity

Robert C. Kennedy, area forester, Virginia Division of Forestry, helped to prepare this section.

Virgin forest once covered all the land in Bedford County, but a large percentage of the land suitable for cultivation has been cleared of trees. On the rest of woodland, farming is impractical or uneconomical because the soils are mostly steep, shallow, stony, or remote. If properly managed, in most areas woodland produces high quality trees.

About 272,000 acres, or about 58 percent of the survey area, is woodland. About 1,200 acres of woodland is in Smith Mountain Lake State Park. The rest is privately owned. About 18,151 acres in the Jefferson National Forest and 1,849 acres of National Park Service land are not included in the survey area.

The largest areas of woodland are in general soil map units 1, 3, 5, 7, and 8, which are described in the section "General Soil Map Units." On uplands, the most common trees are white oak, black oak, chestnut oak, hickory, maple, yellow-poplar, Virginia pine, and shortleaf pine. On stream bottom lands, the main tree species are maple, yellow-poplar, and sycamore. On the mountains, the major tree species are chestnut oak, hickory, and pitch pine. Most of the woodland in the survey area is composed of hardwoods or mixed hardwoods and pine. Scattered tracts of land throughout the county have been planted or replanted with loblolly pine or white pine.

Woodland is an important part of the local economy. About 15 percent of the labor force in the county is employed in the timber industry. Area wood markets are good, and several permanent saw mills are in the county. A paper pulp mill is located at Big Island, in the northern part of the county. Most of the larger timber is harvested for saw logs, and the smaller pine and hardwood trees are used for pulpwood.

Much of the existing commercial woodland can be improved by thinning out mature and low value trees. Thinning stands for rapid growth and replanting with fast-growing, desirable tree species help to increase potential timber production. Essential woodland management practices are preventing forest fires, restricting grazing by livestock, and controlling diseases and insects. In areas where timber is harvested installing logging roads and skid trails on the contour and seeding them with grasses help to control erosion.

The Virginia Division of Forestry, the Soil Conservation Service, or the Cooperative Extension Service can assist woodland owners and managers with determining specific management needs on woodland.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed in the tables. The table gives the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, that the indicator species can produce. The larger the number, the greater the potential productivity. The number 1 indicates low productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 through 8, high; 9 through 11, very high; and 12 or more, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates steep slopes; *X*, stones or rocks on the surface; *W*, excessive water in or on the soil; *T*, excessive alkalinity, acidity, sodium salts, or other toxic substances in the soil; *D*, restricted rooting depth caused by bedrock, hardpan, or other restrictive layer; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, high content of rock fragments in the soil profile. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

*Erosion hazard* is the probability that erosion can occur as a result of site preparation or following cutting operations and where the soil is exposed, for example, roads, skid trails, fire lanes, and log handling areas. Forests that are abused by fire or overgrazing are also subject to erosion. The ratings for the erosion hazard are based on the percent of the slope and on the erosion factor K shown in table 15. A rating of *slight* indicates that no particular measures to prevent erosion are needed under ordinary conditions. A rating of *moderate* indicates that erosion control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

The proper construction and maintenance of roads, trails, landings, and fire lanes will help overcome the erosion hazard.

*Equipment limitation* reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that equipment use normally is not restricted either in kind of equipment that can be used or time of year because of soil factors. If soil wetness is a factor, equipment use can be restricted for a period not to exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If soil wetness is a factor, equipment use is restricted for 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either in kind of equipment or season of use. If soil wetness is a factor, equipment use is restricted for more than 3 months.

Choosing the most suitable equipment and timing harvesting and other management operations to avoid seasonal limitations help overcome the equipment limitation.

*Seedling mortality* refers to the probability of death of naturally occurring or planted tree seedlings as influenced by kinds of soil or topographic conditions. The factors considered in rating the soils for seedling mortality are texture of the surface layer, depth and duration of the water table, rock fragments in the surface layer, rooting depth, and aspect of the slope. A rating of *slight* indicates that under usual conditions the expected mortality is less than 25 percent. A rating of *moderate* indicates that the expected mortality is 25 to 50 percent. Extra precautions are advisable. A rating of *severe* indicates that the expected mortality is more than 50 percent. Extra precautions are important. Replanting may be necessary.

The use of special planting stock and special site preparation, such as bedding, furrowing, or surface drainage, can help reduce seedling mortality.

*Windthrow hazard* is the likelihood of trees being uprooted (tipped over) by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions are a seasonal high water table and bedrock or a fragipan or other limiting layer. A rating of *slight* indicates that normally no trees are blown down by the wind. Strong winds may break trees but do not uproot them. A rating of *moderate* indicates that moderate or strong winds may blow down an occasional tree during periods of soil wetness. A rating of *severe* indicates that moderate or strong winds may blow down many trees during periods of soil wetness.

The use of specialized equipment that does not damage surficial root systems during partial cutting operations can help reduce windthrow. Care in thinning or no thinning also can help reduce windthrow.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on that soil and the one that determines the ordination class.

*Trees to plant* are those that are suitable for commercial wood production.

## Recreation

Outdoor recreation in Bedford County includes camping, picnicking, hiking, hunting, fishing, sightseeing, swimming, boating, golf, and tennis. Opportunities for recreation on National Park Service land are available on the Blue Ridge Parkway, at the Peaks of Otter Lodge, and at the Jefferson National Forest, Smith Mountain Lake, the Smith Mountain Lake State Park, and Leesville Lake.

Several privately owned campgrounds in the county have facilities for camping, picnicking, and swimming. Three country clubs have facilities for golf, swimming, and tennis. There is also a public golf course. Portions of the Appalachian Trail in the mountains along the western border of the county are used for hiking and backpacking. In Bedford County and in the City of Bedford, outdoor recreation programs for youths and adults include baseball, softball, soccer, tennis, and other sports. Outdoor recreation facilities are also available at several public schools scattered throughout the county.

Use of the recreation areas and the development of recreation facilities in the county have increased steadily in the past few years. Continued use and development is likely because large population centers are near on both the west and the east sides of the county and because major highways cross the county. In many areas of the county most of the soils are well suited to outdoor recreation.

The mountainous areas in the western part of the county are mostly in the National Park Service land and in the Jefferson National Forest. They provide opportunities for hunting, trout fishing, camping, picnicking, hiking, backpacking, and sightseeing. Along the southern border of the county, in the vicinity of Leesville Lake, Smith Mountain Lake, and Smith Mountain Lake State Park, recreational opportunities include camping, picnicking, boating, swimming, water-skiing, sailing, and fishing. Several marinas are located on the shores of the lakes. Facilities for outdoor recreation, such as golf, softball, soccer, tennis, swimming, fishing in farm ponds, and hunting are available at various scattered locations throughout the county.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

*Camp areas* require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

*Playgrounds* require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

*Paths and trails* for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

*Golf fairways* are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

## Wildlife Habitat

The population of wildlife and fish in Bedford County is large and varied. White-tailed deer, squirrels, wild turkey, opossum, skunk, red fox, raccoon, and various song birds commonly inhabit the wooded areas throughout the county. Black bear, bobcat, and grouse are found mainly in the wooded, mountainous areas in the western part of the county. Bobwhite quail, cottontail rabbits, and doves abound in or near farming areas. Woodcock inhabit moist woodland sites. Wood duck and mallard are found on or near wetlands, streams, rivers, or lakes. The major wetland mammals include beaver, muskrat, mink, and otter.

Rainbow trout are stocked annually in some mountain streams in the western part of the county. Striped bass, largemouth bass, crappie, and channel catfish are in Leesville Lake and Smith Mountain Lake. Smallmouth bass and channel catfish inhabit the James River. Largemouth bass, bream, and channel catfish have been stocked in many farm ponds and small lakes throughout the county. Migratory waterfowl use resting and feeding areas in some lakes, ponds, and wetlands.

In many areas of the county management can improve habitat for wildlife. The management must increase the quality of food, cover, and water for wildlife in all parts of the county. The mountainous areas in the western half of the county are commonly quite stony, and are best suited to habitat for woodland wildlife.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

*Grain and seed crops* are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, soybeans, and sorghum.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, bromegrass, clover, and alfalfa.

*Wild herbaceous plants* are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggartick, quackgrass, and ragweed.

*Hardwood trees* and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, birch, cherry, maple, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are privet, autumn-olive, and American hazel.

*Coniferous plants* furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and hemlock.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, arrowhead, burreed, pickerelweed, cordgrass, rushes, sedges, and reeds.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, swamps, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

*Habitat for openland wildlife* consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadow vole, meadowlark, field sparrow, cottontail, and red fox.

*Habitat for woodland wildlife* consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

*Habitat for wetland wildlife* consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, frogs, and tree swallow.

## Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils* *may be included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.*

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

## Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

*Dwellings and small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

*Lawns and landscaping* require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

## Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

*Sewage lagoons* are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

*Sanitary landfills* are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

*Daily cover for landfill* is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

### Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

*Roadfill* is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

*Sand and gravel* are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

*Topsoil* is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

## Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

*Pond reservoir areas* hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

*Embankments, dikes, and levees* are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

*Drainage* is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

*Irrigation* is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

*Terraces and diversions* are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

*Grassed waterways* are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

# Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

## Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

*Depth* to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

*Rock fragments* larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit* and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

## Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Moist bulk density* is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

*Permeability* refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

*Available water capacity* refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Soil reaction* is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

*Shrink-swell potential* is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

*Erosion factor K* indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

## Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

Some soils in table 16 are assigned to two hydrologic soil groups. Dual grouping is used for some soils that have a seasonal high water table but can be drained. In this instance the first letter applies to the drained condition of the soil and the second letter to the undrained condition.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

*Flooding*, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional*, or *frequent*. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *Common* is used when classification as occasional or frequent does not affect interpretations. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

*High water table* (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched, artesian*, or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

*Depth to bedrock* is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

*Potential frost action* is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

# Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(4)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisols.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udults (*Udu*, meaning humid, plus *ult*, from Ultisols).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, kaolinitic, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

## Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (3)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (4)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

### Altavista Series

The Altavista series consists of very deep, moderately well drained soils that formed in alluvial sediments on low stream terraces. These soils are near creeks and rivers and, in the Piedmont, commonly near the heads of drainageways. They are subject to rare flooding. Slopes range from 2 to 7 percent.

Altavista soils are commonly near Chewacla, State, and Toccoa soils. Altavista soils are better drained than and have an argillic horizon rather than a cambic horizon typical of Chewacla soils. Altavista soils are more poorly drained than State soils, and have gray mottles in the upper part of the subsoil, which are not in the upper part of the subsoil of State soils. They have more clay in the subsoil than Toccoa soils.

Typical pedon of Altavista fine sandy loam, 2 to 7 percent slopes, 4,000 feet east and 400 feet north of the intersection of U.S. Highway 460 and Virginia Route 741, near Goose Creek, in a cultivated field:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate very coarse and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few medium roots; moderately acid; abrupt smooth boundary.

Bt1—8 to 19 inches; yellowish brown (10YR 5/6) clay loam; moderate medium and coarse subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine roots; few distinct clay films; very strongly acid; clear wavy boundary.

Bt2—19 to 30 inches; yellowish brown (10YR 5/8) clay loam; few fine distinct yellowish red (5YR 5/8), common medium distinct dark yellowish brown (10YR 4/4), and many medium distinct light brownish gray (10YR 6/2) mottles; moderate very thick platy structure; hard, firm, sticky and slightly plastic; common very fine and few fine roots; many prominent clay films; very strongly acid; clear wavy boundary.

Bt3—30 to 46 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/4), and black (10YR 2/1) sandy clay loam; moderate thick platy structure; hard, firm, sticky and slightly plastic; many prominent clay films; very strongly acid; gradual wavy boundary.

Bt4—46 to 65 inches; yellowish brown (10YR 5/8) clay loam; few fine distinct yellowish red (5YR 5/8), common medium distinct brown (10YR 5/3), and many medium distinct light brownish gray (10YR 6/2) mottles; moderate thick platy structure; hard, firm, sticky and slightly plastic; many prominent clay films; very strongly acid; gradual wavy boundary.

BC—65 to 72 inches; strong brown (7.5YR 5/8) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2) mottles; weak very thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many distinct clay films; very strongly acid.

The solum ranges from 30 to 60 inches or more. Depth to bedrock is more than 60 inches. Rock fragments range from 0 to 5 percent throughout the solum. In unlimed areas reaction ranges from very strongly acid to moderately acid.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 or 4. It is fine sandy loam or loam.

Some pedons have an E horizon. This horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 6. It is fine sandy loam or loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 8. In the lower part it has chroma of 1 or 2, and is mottled. It is clay loam or sandy clay loam.

The BC horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8, and is mottled. It is sandy clay loam or loam.

## Ashe Series

The Ashe series consists of moderately deep, somewhat excessively drained soils that formed in weathered granite and granite gneiss. These soils are on the sides of mountain ridges and on narrow mountain ridgetops in the Blue Ridge Mountains. Slopes range from 15 to 60 percent.

Ashe soils are commonly near Edneytown and Hayesville soils. They have less clay in the subsoil than and are shallower to hard bedrock than Edneytown and Hayesville soils. They also have a subsoil that is less red than that of Hayesville soils.

Typical pedon of Ashe gravelly sandy loam, 25 to 60 percent slopes, very stony, 7,375 feet east and 9,875 feet north of the intersection of Virginia Routes 640 and 849 and about 200 feet west of a private road on Suck Mountain, in woodland:

Oi—3 inches to 0; loose leaves, twigs, pine needles, and partly decomposed organic material; many very fine and fine roots.

A—0 to 5 inches; dark yellowish brown (10YR 4/6) gravelly sandy loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine, common medium, and few coarse roots; 10 percent granite stones, 5 percent granite cobbles, and 20 percent granite gravel; very strongly acid; clear wavy boundary.

Bw1—5 to 9 inches; yellowish brown (10YR 5/6) gravelly sandy loam; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine and medium and few coarse roots; 20 percent granite gravel and 5 percent granite cobbles; very strongly acid; clear wavy boundary.

Bw2—9 to 23 inches; yellowish brown (10YR 5/8) gravelly sandy loam; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and medium and few coarse roots; 25 percent granite gravel and 5 percent granite cobbles; very strongly acid; irregular boundary.

R—23 inches; hard granite bedrock.

The solum is 20 to 40 inches thick. Depth to bedrock ranges from 20 to 40 inches. Content of gravel, cobbles, and stones ranges from 5 to 35 percent in all horizons. Stones cover 3 to 15 percent of the surface. Reaction is very strongly acid or strongly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 6. In the fine earth fraction it is loam, sandy loam, or fine sandy loam.

Some pedons have an E horizon that has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. In the fine earth fraction it is sandy loam, loam, or fine sandy loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8.

Some pedons have a C horizon, which is multicolored, weathered granite or granite gneiss that, in the fine earth fraction, crushes to sandy loam.

Some pedons have a Cr horizon that has colors similar to those of the Bw horizon. It is moderately hard, multicolored granite or granite gneiss.

## Berks Series

The Berks series consists of moderately deep, well drained soils that formed in weathered shale. These soils are on ridgetops and on the sides of ridges at the base of the Blue Ridge Mountains in the upper Goose Creek Valley. Slopes range from 7 to 60 percent.

Berks soils are commonly near Braddock, Laidig, Sequoia, and Thurmont soils. These soils are shallower to bedrock, have a thinner solum, and have a subsoil that is less red and that has less clay and more rock fragments than Braddock soils. They are shallower to bedrock, have a thinner solum, and do not have the fragipan typical of Laidig soils. They have less clay and generally more rock fragments in the subsoil than in that of Sequoia soils. They are shallower to bedrock and generally have more rock fragments in the subsoil than in that of Thurmont soils.

Typical pedon of Berks channery loam, 25 to 60 percent slopes, about 3,000 feet north and 1,375 feet east of the intersection of Virginia Routes 680 and 695, in woodland:

Oi—1 inch to 0; loose leaves, twigs, and pine needles.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) channery loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; 30 percent hard shale fragments; very strongly acid; clear wavy boundary.

Bw1—1 to 11 inches; yellowish brown (10YR 5/4) channery loam; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; common very fine, and few fine medium and coarse roots; 35 percent hard shale fragments; very strongly acid; clear wavy boundary.

Bw2—11 to 21 inches; yellowish brown (10YR 5/6) extremely channery loam; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; few very fine, fine, medium, and coarse roots; 70 percent hard shale fragments; very strongly acid; clear wavy boundary.

Cr—21 to 36 inches; brownish yellow (10YR 6/8) and light brownish gray (2.5Y 6/2) fractured shale that crushes to extremely channery loam; few very fine, fine, medium, and coarse roots; shale fragments coated with clay flows; 75 percent hard shale fragments and 15 percent soft shale fragments; very strongly acid; abrupt wavy boundary.

R—36 inches; brownish yellow (10YR 6/8) and light brownish gray (2.5Y 6/2) hard, fractured shale.

The solum is 18 to 40 inches thick. Depth to bedrock ranges from 20 to 40 inches. Shale fragments range from 10 to 50 percent, by volume, in the A horizon, 15 to 75 percent in the Bw horizon, and 35 to 90 percent in the C horizon. Reaction ranges from extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. In the fine earth fraction it is loam or silt loam.

The Bw horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8, but it has hue of 5YR only in the lower part of the horizon. In the fine earth fraction it is loam or silt loam.

The Cr horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8. In the fine earth fraction it is loam or silt loam.

## Braddock Series

The Braddock series consists of very deep, well drained soils that formed in colluvial sediments derived mainly from granite and granite gneiss. These soils are on foot slopes of mountains, ridgetops, and sides of ridges in the Blue Ridge Mountains. Slopes range from 2 to 25 percent.

Braddock soils commonly are near Edneytown, Hayesville, and Thurmont soils. They have a thicker solum, more clay in the subsoil, and a redder subsoil than Edneytown soils. They have a redder subsoil that has more clay than Thurmont soils. They have mixed mineralogy, but Hayesville soils have oxidic mineralogy. Braddock soils commonly have a subsoil that is a darker red and that has more sticky clay than that of Hayesville soils.

Typical pedon of Braddock fine sandy loam, 2 to 7 percent slopes, 1,000 feet east and 625 feet north of the intersection of Virginia Routes 616 and 757, adjacent to a cultivated field, in a road cut:

Ap—0 to 11 inches; brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; 2 percent quartz gravel as much as 2 inches in diameter; neutral; clear smooth boundary.

BA—11 to 14 inches; yellowish red (5YR 4/6) clay loam; moderate fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine and fine roots; few faint clay films on faces of peds; some peds and root channels coated with Ap horizon material; moderately acid; clear smooth boundary.

Bt1—14 to 40 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; hard, friable, very sticky and slightly plastic; few very fine and fine roots; many distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—40 to 48 inches; dark red (2.5YR 3/6) clay; common fine distinct light yellowish brown (10YR 6/4) and yellowish brown (10YR 5/8) mottles; weak very thick platy structure parting to moderate medium angular blocky; hard, friable, very sticky and slightly plastic; many prominent clay films on faces of peds; horizon is compact in place; very strongly acid; gradual smooth boundary.

BC—48 to 72 inches; dark red (2.5YR 3/6) clay; many medium distinct strong brown (7.5YR 5/8) and pale brown (10YR 6/3) and common fine distinct light gray (10YR 7/2) mottles; moderate very thick platy structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and slightly plastic; very few faint clay films on faces of peds; the upper part of the horizon is compact in place; very strongly acid.

The solum ranges from 40 to 60 inches or more. Depth to bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 35 percent in the A and E horizons and from 0 to 15 percent in the Bt horizon. Unless the surface has been limed, reaction is very strongly acid or strongly acid in all horizons.

The Ap, or A, horizon has hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 4 or 6. Where value is 2 or 3, the horizon is less than 6 inches thick. In the fine earth fraction it is fine sandy loam or loam.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. In the fine earth fraction it is fine sandy loam or loam.

The BA or BE horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 or 8.

The Bt horizon has a hue of 2.5YR, value of 3 to 5, and chroma of 6 or 8. It is commonly mottled in the lower part. It is clay or clay loam.

Some pedons have a BC horizon that has hue of 2.5YR, value of 3 to 5, and chroma of 6 or 8, and is mottled.

Some pedons have a C horizon that is commonly mottled. It is clay loam or sandy clay loam.

## Cecil Series

The Cecil series consists of very deep, well drained soils that formed in weathered mica schist, mica gneiss, and granite gneiss. These soils are on Piedmont uplands. Slopes range from 2 to 15 percent.

Cecil soils commonly are near Cullen, Grover, Madison, Poindexter, Sweetapple, Turbeville, and Wateree soils. Cecil soils have kaolinitic mineralogy, but Cullen and Turbeville soils have mixed mineralogy. They have a thicker solum and have more clay in the subsoil than Grover soils. They have a thicker solum than Madison soils. They have a thicker solum, have more clay in the subsoil, and have a redder subsoil than Poindexter, Sweetapple, and Wateree soils. They are deeper to bedrock, have a lower base saturation, and are more acid throughout than Poindexter soils.

Typical pedon of Cecil fine sandy loam, 2 to 7 percent slopes, 2,750 feet east and 250 feet north of the intersection of Virginia Routes 723 and 722, in woodland:

Oi—3 inches to 0; loose leaves, twigs, and partly decomposed organic material; many fine roots.

A—0 to 2 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many fine, common medium and coarse roots; 5 percent quartz gravel; very strongly acid; abrupt smooth boundary.

E—2 to 6 inches; brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; slightly hard, friable, slightly sticky and nonplastic; common fine, medium, and coarse roots; 5 percent quartz gravel; very strongly acid; abrupt wavy boundary.

BE—6 to 9 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common faint clay films on faces of peds; 2 percent quartz gravel; few fine flakes of mica; very strongly acid; clear wavy boundary.

Bt1—9 to 23 inches; red (2.5YR 4/6) clay; strong medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and medium roots; many distinct clay films on faces of peds; common medium flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—23 to 42 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine and common medium roots; many prominent clay films on faces of peds; common medium flakes of mica; very strongly acid; gradual wavy boundary.

BC—42 to 56 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common distinct clay films on faces of peds; many medium flakes of mica; very strongly acid; gradual wavy boundary.

C—56 to 72 inches; red (2.5YR 4/6) saprolite of mica gneiss that crushes to loam; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots;

thick clay flows coat faces of rock; many medium flakes of mica; very strongly acid.

The solum ranges from 40 to 60 inches in thickness. Depth to hard bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 15 percent, by volume, in the A and E horizons and from 0 to 10 percent in the Bt horizons. Content of mica flakes ranges from few to common in the A, E, and Bt horizons and common to many flakes of mica in the BC and C horizons. Reaction is very strongly acid or strongly acid, unless the surface has been limed.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6. It is fine sandy loam or loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam or loam.

The BE horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is sandy clay loam or clay loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is clay or clay loam.

The BC horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is clay loam or sandy clay loam.

The C horizon is commonly multicolored mica schist or mica gneiss.

## Chewacla Series

The Chewacla series consists of very deep, somewhat poorly drained soils that formed in alluvial sediments deposited by floodwaters of streams. These soils are on flood plains of rivers and streams and are subject to occasional flooding. Slopes range from 0 to 2 percent.

Chewacla soils are commonly near Altavista, State, and Toccoa soils. Chewacla soils are more poorly drained. In addition, Chewacla soils do not have an argillic horizon typical of Altavista and State soils.

Typical pedon of Chewacla loam, 0 to 2 percent slopes, 7,750 feet east and 1,125 feet south of the intersection of Virginia Routes 715 and 808, in the flood plain of Falling Creek, in woodland:

Oi—1 inch to 0; loose leaves and twigs.

Ap—0 to 10 inches; reddish brown (5YR 4/4) loam; weak fine subangular blocky structure; hard, friable, sticky and slightly plastic; few medium and coarse, and common very fine and fine roots; common medium mica flakes; strongly acid; clear smooth boundary.

Bw1—10 to 16 inches; dark brown (7.5YR 4/4) sandy loam; many fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; few very fine, fine, medium, and coarse roots; common medium mica flakes; strongly acid; clear smooth boundary.

Bw2—16 to 24 inches; mottled grayish brown (10YR 5/2), brown (10YR 5/3), and dark brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; sticky and slightly plastic; few very fine, fine, medium and coarse roots; common medium mica flakes; strongly acid; clear wavy boundary.

Bw3—24 to 33 inches; mottled strong brown (7.5YR 4/6), gray (10YR 6/1), dark yellowish brown (10YR 4/4), and dark brown (10YR 4/3) sandy clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine and fine roots; common medium mica flakes; common soft black manganese accumulations up to 5 millimeters in diameter; strongly acid; clear smooth boundary.

Bw4—33 to 41 inches; mottled gray (10YR 6/1) and strong brown (7.5YR 4/6) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few fine roots; common medium mica flakes; few soft black round iron and manganese accumulations up to 3 millimeters in diameter; strongly acid; abrupt smooth boundary.

C—41 to 72 inches; gray (10YR 5/1) loamy sand; single grain; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; 10 percent, semirounded quartz gravel in the lower part of the horizon; strongly acid.

The solum ranges from 35 to 60 inches or more. Depth to bedrock is more than 5 feet. Fine mica flakes range from few to common throughout. Content of rock fragments ranges from 0 to 5 percent, by volume, in the A and B horizons. Reaction throughout is strongly acid or moderately acid, unless the surface has been limed.

The A, or Ap, horizon has a hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. It is loam or fine sandy loam.

The B horizon in the upper part has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 6. In the lower part it has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 1 to 6. Gray mottles, which are indicative of wetness, are within 24 inches of the surface. The horizon is sandy loam, loam, sandy clay loam, or clay loam.

The C horizon is loamy sand, loam, sandy loam, or sand and gravel.

## Cullen Series

The Cullen series consists of very deep, well drained soils that formed in weathered hornblende gneiss. These soils are on the Piedmont uplands. Slopes range from 2 to 25 percent.

Cullen soils commonly are near Cecil, Iredell, Madison, Mecklenburg, and Poindexter soils. They have a redder subsoil and a thicker solum than Iredell soils. They have mixed mineralogy, but Madison and Cecil soils have kaolinitic mineralogy. They also have a thicker solum and fewer mica flakes in the subsoil than Madison soils. They have a thicker solum and a lower base saturation than Mecklenburg soils. They have a redder subsoil, more clay in the subsoil, and a thicker solum than Poindexter soils.

Typical pedon of Cullen loam, 2 to 7 percent slopes, 8,500 feet south and 2,000 feet west of the intersection of Virginia Routes 708 and 818, in woodland:

Ap—0 to 5 inches; reddish brown (5YR 4/4) loam; moderate fine granular structure; slightly hard, firm, sticky and slightly plastic; common very fine, fine, medium and coarse roots; 10 percent quartz and hornblende gneiss gravel; strongly acid; abrupt smooth boundary.

Bt1—5 to 33 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; hard, firm, sticky and slightly plastic; few very fine and fine, and common medium and coarse roots; many prominent clay films on faces of peds; 2 percent soft, weathered hornblende gneiss; strongly acid; clear wavy boundary.

Bt2—33 to 53 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; hard, firm, sticky and slightly plastic; few fine roots; many prominent clay films on faces of peds; 5 percent quartz gravel; 20 percent of horizon composed of soft, weathered hornblende gneiss; strongly acid; gradual wavy boundary.

Bt3—53 to 62 inches; dark red (2.5YR 3/6) clay loam; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; many prominent clay films on faces of peds; 5 percent quartz gravel; 45 percent of horizon composed of soft, weathered hornblende gneiss; moderately acid; gradual irregular boundary.

C—62 to 72 inches; weathered strong brown (7.5YR 5/8) saprolite of hornblende gneiss that crushes to clay loam; massive; slightly hard, firm, slightly sticky and slightly plastic; faces of rock coated with thick clay flows and clay lenses; 2 percent quartz gravel; moderately acid.

The solum is 40 to 60 inches or more thick. Depth to bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 15 percent throughout. Reaction is strongly acid or moderately acid, unless the surface has been limed.

The A, or Ap, horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6.

Some pedons have a BA or BE horizon that has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8.

The Bt horizon has hue of 10R or 2.5YR, value of 3 to 5, and chroma of 4 to 8. It is clay or clay loam.

Some pedons have a BC horizon that has hue of 2.5YR or 10R, value of 4 to 6, and chroma of 6 or 8.

The C horizon is commonly multicolored, weathered hornblende gneiss that crushes to loam or clay loam.

## Dekalb Series

The Dekalb series consists of moderately deep, well drained soils that formed in weathered sandstone and quartzite. These soils are on ridgetops and side slopes of the Blue Ridge Mountains. Slopes range from 15 to 60 percent.

Dekalb soils are commonly near Braddock, Laidig, and Sequoia soils. Dekalb soils have a thinner solum, are shallower to bedrock, and have more rock fragments in the subsoil than Braddock and Laidig soils. They have a subsoil that has less clay and is less red than that of Braddock soils. Unlike Dekalb soils, Laidig soils have a fragipan. Dekalb soils have less clay and more rock fragments in the subsoil than Sequoia soils.

Typical pedon of Dekalb very channery sandy loam, 25 to 60 percent slopes, very stony, about 6,500 feet west and 4,000 feet north of the intersection of U.S. Highway 460 and Virginia Route 698, north of the Blue Ridge stone quarry on the side of the Blue Ridge Mountains about 300 feet below the Blue Ridge Parkway, in woodland:

Oi—2 inches to 0; loose leaves, twigs, pine needles, and partly decomposed organic material; common very fine and few fine roots.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) very channery sandy loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine, fine, medium and coarse roots; 50 percent sandstone channers and 8 percent quartzite stones; very strongly acid; abrupt smooth boundary.

A2—2 to 5 inches; dark yellowish brown (10YR 4/4) extremely channery sandy loam; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine, and common medium and coarse roots; 60 percent sandstone channers; very strongly acid; clear wavy boundary.

Bw—5 to 21 inches; yellowish brown (10YR 5/6) very channery sandy loam; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine, and common medium and coarse roots; 55 percent sandstone channers and flagstones; very strongly acid; clear wavy boundary.

C—21 to 25 inches; yellowish brown (10YR 5/6) extremely channery sandy loam; massive; soft, very friable, slightly sticky and slightly plastic; few fine, and common medium and coarse roots; 85 percent sandstone channers and flagstones; very strongly acid; abrupt irregular boundary.

R—25 inches; fractured, hard sandstone bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. Content of rock fragments ranges from about 10 to 60 percent in individual horizons of the solum and from 50 to 90 percent in the C horizon. Reaction is very strongly acid or strongly acid, unless the surface has been limed.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 4. In the fine earth fraction it is sandy loam or loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 4 to 8. In the fine earth fraction it is sandy loam or loam.

The C horizon has hue of 7.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. In the fine earth fraction it is sandy loam or loamy sand.

## Edneytown Series

The Edneytown series are deep, well drained soils that formed in weathered granite or granite gneiss. These soils are on ridgetops and side slopes of the Blue Ridge Mountains. Slopes range from 7 to 60 percent.

Edneytown soils are commonly near Ashe, Braddock, Edneyville, Hayesville, and Thurmont soils. Edneytown soils have more clay in the subsoil and are deeper to bedrock than Ashe soils. They have less clay and are less red in the subsoil than Braddock and Hayesville soils. They have more clay in the subsoil than Edneyville soils and have an argillic horizon, but Edneyville soils have a cambic horizon. Edneytown soils have a thinner solum than Thurmont soils, but Thurmont soils formed in colluvial and alluvial sediments.

Typical pedon of Edneytown loam, 25 to 60 percent slopes, 2,125 feet north and 1,000 feet east of the intersection of Virginia Routes 602 and 637, in woodland:

Oi—1 inch to 0; partly decomposed organic material.

A—0 to 5 inches; dark yellowish brown (10YR 4/4) loam; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and common very fine, medium, and coarse roots; 15 percent granite gravel; strongly acid; clear wavy boundary.

Bt1—5 to 19 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium, and few coarse roots; common faint clay films; 15 percent granite gravel; few very fine mica flakes; very strongly acid; gradual wavy boundary.

Bt2—19 to 31 inches; strong brown (7.5YR 4/6) clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common faint clay films; 2 percent granite gravel; few very fine mica flakes; very strongly acid; clear wavy boundary.

BC—31 to 40 inches; strong brown (7.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common faint clay films; 40 percent of horizon composed of multicolored, crushable, weathered granite gneiss; few very fine mica flakes; very strongly acid; clear wavy boundary.

Cr1—40 to 47 inches; multicolored yellowish red (5YR 5/8), strong brown (7.5YR 4/6), very pale brown (10YR 8/3), and very dark grayish brown (10YR 3/2) weathered granite gneiss that crushes to sandy loam; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; thin clay flows coat faces of rock; common very fine mica flakes; very strongly acid; abrupt wavy boundary.

Cr2—47 to 72 inches; multicolored strong brown (7.5YR 5/8), very pale brown (10YR 8/3), and olive brown (2.5Y 4/4) weathered granite gneiss that crushes to sandy loam; massive; soft, friable, slightly sticky and nonplastic; few fine roots; common very fine mica flakes; very strongly acid.

The solum is 20 to 40 inches thick. Depth to a Cr horizon is 40 inches or more. Depth to hard bedrock is more than 5 feet. Content of rock fragments is 0 to 15 percent in all horizons. Reaction is strongly acid or very strongly acid in all horizons.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 4. It is loam, fine sandy loam, or sandy loam.

Some pedons have an E horizon that has hue of 10YR, value of 4 to 7, and chroma of 3 to 6. It is loam, fine sandy loam, or sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 4 to 8. It is clay loam or sandy clay loam.

The BC horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 6 or 8.

Some pedons have a C horizon that has hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 3 to 8. It is fine sandy loam or sandy loam.

The Cr horizon is multicolored, weathered granite or granite gneiss that crushes to sandy loam.

## Edneyville Series

The Edneyville series consists of very deep, well drained soils that formed in weathered granite gneiss and granite. These soils are on the sides of mountains and on some narrow mountain ridgetops, generally at elevations above 2,000 feet. Slopes range from 15 to 60 percent.

Edneyville soils are commonly near Edneytown soils. They have less clay in the subsoil than Edneytown soils, and do not have an argillic horizon typical of Edneytown soils.

Typical pedon of Edneyville gravelly fine sandy loam, 25 to 60 percent slopes, extremely stony, located 3,750 feet west and 875 feet north of the intersection of Virginia Routes 675 and 652, on the side of Rocky Mountain:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam; moderate fine granular structure; soft, very friable, sticky and nonplastic; many very fine and fine, and few medium and coarse roots; 20 percent granite gneiss gravel and cobbles and 15 percent granite gneiss stones; very strongly acid; clear wavy boundary.

E—3 to 6 inches; brown (10YR 4/3) gravelly fine sandy loam; weak fine granular structure; soft, very friable, sticky and nonplastic; many very fine and fine, common medium, and few coarse roots; 20 percent granite gneiss gravel and cobbles and 15 percent granite gneiss stones; very strongly acid; clear wavy boundary.

BE—6 to 10 inches; brown (7.5YR 4/4) cobbly fine sandy loam; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine, and few medium and coarse roots; 30 percent granite gravel and cobbles; very strongly acid; clear wavy boundary.

Bw1—10 to 27 inches; strong brown (7.5YR 5/6) cobbly sandy loam; weak medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common very fine and fine, and few medium and coarse roots; 30 percent granite gravel and cobbles; very strongly acid; clear wavy boundary.

Bw2—27 to 40 inches; yellowish brown (10YR 5/6) cobbly sandy loam; weak medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common fine and few medium and coarse roots; 20 percent granite gravel and cobbles; very strongly acid; clear irregular boundary.

Cr—40 to 61 inches; white (10YR 8/1 and 8/2), yellowish brown (10YR 5/8), and light olive brown (2.5Y 5/4) weathered granite gneiss that crushes to sandy loam; massive; slightly hard, very firm, nonsticky and nonplastic; few fine roots; very strongly acid; abrupt irregular boundary.

R—61 inches; hard, granite gneiss bedrock.

The solum is 20 to 40 inches thick. Depth to weathered bedrock is 40 inches or more. Depth to hard bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 35 percent in all horizons of the solum. Unless the surface has been limed, reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. In the fine earth fraction, it is fine sandy loam or loam.

The BE horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. In the fine earth fraction, it is fine sandy loam or loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. In the fine earth fraction, it is sandy loam or fine sandy loam.

## Grover Series

The Grover series consists of very deep, well drained soils that formed in weathered mica schist and mica gneiss. These soils are on the Piedmont uplands. Slopes range from 7 to 40 percent.

Grover soils are commonly near Cecil, Sweetapple, Madison, and Wateree soils. Grover soils are deeper to bedrock and have more clay and flakes of mica in the subsoil than Wateree soils. They have more clay in the subsoil and do not have a cambic horizon typical of Sweetapple soils. They have less clay in the subsoil than Madison soils. They have a thinner solum and less clay in the subsoil than Cecil soils.

Typical pedon of Grover fine sandy loam, 25 to 40 percent slopes, 4,500 feet south and 1,250 feet east of the intersection of Virginia Route 825 and U.S. Highway 460, in woodland:

Oi—3 inches to 0; loose leaves, twigs, and partly decomposed organic material.

A—0 to 2 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine, and few medium and coarse roots; few medium flakes of mica; neutral; abrupt wavy boundary.

E—2 to 9 inches; brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, and few medium and coarse roots; 2 percent quartz gravel; few medium flakes of mica; very strongly acid; clear wavy boundary.

BE—9 to 12 inches; yellowish red (5YR 5/6) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, and few medium and coarse roots; many faint clay films; common medium flakes of mica; very strongly acid; clear wavy boundary.

Bt—12 to 28 inches; yellowish red (5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, and few medium and coarse roots; many faint clay films; many medium flakes of mica; very strongly acid; gradual wavy boundary.

BC—28 to 36 inches; reddish brown (5YR 4/4) sandy loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common fine roots; common faint clay films; many medium flakes of mica; 40 percent soft crushable mica schist; very strongly acid; gradual wavy boundary.

C—36 to 72 inches; yellowish red (5YR 4/6), strong brown (7.5YR 5/8), and dark brown (7.5YR 3/2) saprolite of mica schist and mica gneiss that crushes to sandy loam; massive; soft, very friable, nonsticky and nonplastic; common fine roots; many medium flakes of mica; common clay flows coat some rock faces; very strongly acid.

The solum in 20 to 40 inches thick. Depth to hard bedrock is more than 60 inches. Mica flakes range from few to common in the upper horizons. Many mica flakes are in the lower horizons. Rock fragments range from 0 to 15 percent throughout. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A horizon has a hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6.

The E horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8.

The BE horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 6 or 8.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is clay loam or sandy clay loam.

The BC horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam or sandy clay loam.

The C horizon is multicolored, weathered mica gneiss and mica schist.

## Gunstock Series

The Gunstock series consists of moderately deep, well drained soils that formed in weathered phyllite. These soils are on ridgetops and sides of the Blue Ridge Mountains and on ridgetops and sides of finger ridges extending from the base of mountains into the Piedmont region. Slopes range from 7 to 45 percent.

Gunstock soils commonly are near Dekalb and Edneytown soils. Gunstock soils are shallower to bedrock than Edneytown soils. They are deeper to hard bedrock, have fewer rock fragments in the subsoil, and have more clay in the subsoil than Dekalb soils.

Typical pedon of Gunstock channery loam, 7 to 15 percent slopes, 5,000 feet east and 4,750 feet north of the intersection of Virginia Route 600 and U.S. Highway 501, in woodland:

Oi—3 inches to 0; loose leaves, twigs, pine needles, and partly decomposed organic matter.

A—0 to 8 inches; yellowish brown (10YR 5/4) channery loam; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; 25 percent hard phyllite and quartzite channers as much as 4 inches in length; very strongly acid; clear wavy boundary.

Bt1—8 to 11 inches; brown (7.5YR 5/4) clay loam; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots; 10 percent hard phyllite and 10 percent soft phyllite fragments as much as 3 inches in length; few faint clay films; very strongly acid; clear wavy boundary.

Bt2—11 to 23 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine and fine roots; 15 percent soft crushable phyllite fragments; few distinct clay films; very strongly acid; clear wavy boundary.

Bt3—23 to 34 inches; yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine roots; 40 percent soft weathered phyllite fragments; many distinct clay films; very strongly acid; clear wavy boundary.

Cr—34 to 47 inches; yellowish brown (10YR 5/8), light yellowish brown (10YR 6/4), and light gray (2.5Y 7/2) soft weathered phyllite that crushes to loam; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; clay flows and clay lenses coat rock faces; very strongly acid; abrupt wavy boundary.

R—47 inches; hard, multicolored, fractured phyllite.

The solum ranges from 20 to 40 inches thick. Depth to hard bedrock ranges from 40 to 60 inches. Depth to soft bedrock ranges from 20 to 40 inches. Content of rock fragments ranges from 0 to 50 percent. Unless the surface has been limed, reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 4 to 6. In the fine earth fraction, it is loam or silt loam.

The Bt horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8.

The C horizon is weathered, multicolored phyllite that crushes to silt loam or loam.

## Hayesville Series

The Hayesville series consists of very deep, well drained soils that formed in weathered granite and granite gneiss. These soils are on ridgetops and sides of ridges and on the lower slopes of the Blue Ridge Mountains. Slopes range from 2 to 45 percent.

Hayesville soils are commonly near Ashe, Braddock, Edneytown, Edneyville, and Thurmont soils. Hayesville soils are deeper to bedrock and have a redder subsoil that has more clay than that of Ashe soils. They have oxidic mineralogy, but Braddock soils have mixed mineralogy. In addition, Braddock soils commonly have a subsoil that is a darker red than that of Hayesville soils. Hayesville soils have a redder subsoil that has more clay in the subsoil than that of Edneytown soils and than that of Edneyville soils. They have more clay in the subsoil than that of Thurmont soils.

Typical pedon of Hayesville loam, 7 to 15 percent slopes, 1,125 feet south and 1,250 feet east of the intersection of Virginia Routes 619 and 690, in woodland:

Oi—3 inches to 0; loose leaves, twigs, pine needles, and partly decomposed organic matter; common very fine roots.

A—0 to 6 inches; brown (7.5YR 5/4) loam; weak fine granular structure; slightly hard, friable, sticky and slightly plastic; few medium and coarse, and common fine and very fine roots; 15 percent quartz gravel; very strongly acid; clear wavy boundary.

BE—6 to 9 inches; yellowish red (5YR 5/6) clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few medium and coarse, and common fine and very fine roots; 5 percent quartz gravel; few faint clay films; very strongly acid; clear wavy boundary.

Bt—9 to 40 inches; red (2.5YR 5/6) clay; strong medium subangular blocky structure; hard, firm, sticky and plastic; few fine and very fine, and common medium roots; 5 percent gravel of soft crushable weathered granite gneiss in the lower part; many distinct clay films; very strongly acid; clear wavy boundary.

BC—40 to 51 inches; red (2.5YR 4/6) clay loam; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; 40 percent of horizon consists of saprolite of multicolored granite gneiss; few faint clay films; very strongly acid; clear wavy boundary.

C—51 to 72 inches; white (10YR 8/2), brown (10YR 5/3), and yellowish brown (10YR 5/6) saprolite of granite gneiss that crushes to loam; massive; friable, slightly sticky and slightly plastic; few fine roots; very strongly acid.

The solum is 40 to 60 inches thick. Depth to hard bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 15 percent in all horizons. Unless the surface has been limed, reaction ranges from very strongly acid to moderately acid.

The A, or Ap, horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 or 4. Where value is 3 or less, the horizon is less than 6 inches thick. The A, or Ap, horizon is loam or fine sandy loam.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam or fine sandy loam.

The BE or BA horizon has a hue of 5YR, value of 4 to 6, and chroma of 6 or 8. It is sandy clay loam or clay loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is clay or clay loam.

The BC horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It is clay loam or sandy clay loam.

The C horizon is multicolored granite or granite gneiss that crushes to loam or fine sandy loam.

## Helena Series

The Helena series consists of deep, moderately well drained soils that formed in the weathered products of granite gneiss and mica gneiss. These soils are on Piedmont uplands. Slopes range from 2 to 15 percent.

Helena soils are commonly near Cecil, Iredell, Madison, Mattaponi, and Vance soils. Helena soils are more poorly drained and less red in the subsoil than Cecil soils. They are more acidic and have a lower base saturation than Iredell soils. They are more poorly drained than and are less red and have fewer mica flakes in the subsoil than Madison soils. They have gray mottles in the upper part of the subsoil, but Mattaponi soils have gray mottles in the lower part of the subsoil. Helena soils have gray mottles in the subsoil and are more poorly drained than Vance soils.

Typical pedon of Helena fine sandy loam, 2 to 7 percent slopes, 1,375 feet west of the intersection of Virginia Routes 811 and 711, in an abandoned pasture:

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; soft, friable, slightly sticky and nonplastic; common very fine roots; 10 percent semirounded quartz gravel; very strongly acid; abrupt wavy boundary.

E—4 to 9 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; 10 percent semirounded quartz gravel; material from A horizon coats root channels and wormholes; very strongly acid; abrupt wavy boundary.

BE—9 to 13 inches; yellowish brown (10YR 5/4) sandy clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; 5 percent semirounded quartz gravel; few distinct clay films; very strongly acid; clear wavy boundary.

Bt1—13 to 19 inches; light yellowish brown (10YR 6/4) clay; many medium distinct red (2.5YR 5/8) mottles; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; 5 percent quartz gravel; few distinct clay films; strongly acid; clear wavy boundary.

Bt2—19 to 35 inches; mottled strong brown (7.5YR 5/4), yellowish red (5YR 5/6), and light gray (10YR 7/2) clay; weak coarse subangular blocky structure; hard, firm, sticky and very plastic; few very fine roots; common distinct clay films; few fine mica flakes; very strongly acid; gradual wavy boundary.

Bt3—35 to 48 inches; mottled strong brown (7.5YR 5/6), olive gray (5Y 5/2), light gray (5Y 6/1), and light olive gray (5Y 6/2) clay; weak coarse subangular blocky structure; very hard, very firm, sticky and very plastic; few very fine roots; many prominent clay films; few fine mica flakes; very strongly acid; gradual wavy boundary.

BC—48 to 59 inches; mottled yellowish brown (10YR 5/6), light gray (N 6/0 and 5Y 7/1), and white (5Y 8/2) clay loam; weak coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common faint clay films; few fine mica flakes; 15 percent of horizon composed of soft, weathered gneiss; strongly acid; gradual wavy boundary.

Cr—59 to 72 inches; white (10YR 8/2) and yellowish brown (10YR 5/6) weathered gneiss that crushes to fine sandy loam; massive; slightly hard, friable, slightly sticky and slightly plastic; prominent clay lenses coat some rock faces; common fine mica flakes; very strongly acid.

The solum ranges from 40 to 60 inches. Depth to bedrock is 40 to 60 inches. Content of rock fragments ranges from 0 to 15 percent. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A, or Ap, horizon has hue of 10YR, value of 3 to 6, and chroma of 2 or 4.

The E horizon has hue of 10YR, value of 6 or 8, and chroma of 2 to 4.

The BE horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. It is sandy clay loam or clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 3 to 8. Some pedons are dominantly gray in the lower part of the horizon. Low chroma mottles are in the upper 24 inches of the horizon. The horizon is clay or sandy clay.

The BC horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 8, or it is mottled or dominantly gray. It is clay loam or sandy clay loam.

## Iredell Series

The Iredell series consists of very deep, moderately well drained or somewhat poorly drained soils that formed in weathered hornblende gneiss, diabase, or greenstone. These soils are on the Piedmont uplands. Slopes range from 2 to 15 percent.

Iredell soils are commonly near Cecil, Cullen, Madison, Mecklenburg, and Poindexter soils. Iredell soils have a yellower and more plastic subsoil, are less acidic, and have higher base saturation than Cecil, Cullen, Madison, and Mecklenburg soils. They have less mica in the subsoil and are more acidic throughout than Madison soils. They are shallower to the solum than Cecil and Cullen soils. They have more clay in the subsoil than and are deeper to hard bedrock than Poindexter soils.

Typical pedon of Iredell fine sandy loam, 2 to 7 percent slopes, 500 feet north and 250 feet east of the intersection of Virginia Routes 805 and 626, in an abandoned field:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; slightly hard, friable, sticky and slightly plastic; many fine roots; common black concretions up to 2 mm in diameter; 10 percent gravel; slightly acid; abrupt smooth boundary.

E—7 to 11 inches; light brownish gray (10YR 6/2) fine sandy loam; weak fine granular structure; slightly hard, friable, sticky and slightly plastic; many fine roots; common black concretions up to 2 mm in diameter; 10 percent gravel; neutral; abrupt wavy boundary.

Bt1—11 to 16 inches; dark yellowish brown (10YR 4/4) clay; weak medium subangular blocky structure; extremely hard, very firm, very sticky and very plastic; common fine roots; many faint clay films; few black manganese stains; 5 percent gravel; few slickensides; neutral; clear wavy boundary.

Bt2—16 to 27 inches; dark yellowish brown (10YR 4/4) clay; weak medium prismatic structure; extremely hard, very firm, very sticky and very plastic; common fine roots; few slickensides; common faint clay films; common black manganese stains; few white mineral grains up to 2 mm in diameter; 10 percent weathered crushable basic rock; neutral; clear wavy boundary.

BC—27 to 37 inches; dark yellowish brown (10YR 4/4) clay loam; few fine distinct black (10YR 2/1) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; hard, firm, sticky and slightly plastic; few fine roots; common faint clay films; 25 percent weathered crushable basic rock fragments; neutral; gradual wavy boundary.

C—37 to 72 inches; dark yellowish brown (10YR 4/4), very dark gray (10YR 3/1), and light olive brown (2.5Y 5/4) saprolite of basic rock that crushes to sandy clay loam; massive; hard, friable, sticky and slightly plastic; few fine roots; rock faces are coated with thin clay flows; neutral.

The solum is 20 to 40 inches thick. Depth to hard bedrock is more than 60 inches. Most pedons have few to many dark concretions throughout. Reaction is strongly acid to neutral in the A horizon, slightly acid to mildly alkaline in the B horizon, and neutral to moderately alkaline in the C horizon.

The A, or Ap, horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is fine sandy loam or loam.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 to 3. It is fine sandy loam or loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6 in the upper part. In the middle part it has hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 to 6. In the lower part it has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. The horizon is clay or clay loam.

The C horizon is multicolored, weathered basic rock that crushes to sandy clay loam or sandy loam.

Some pedons have a Cr horizon that has multicolored, firm to very firm, basic rock.

## Laidig Series

The Laidig series consists of very deep, well drained soils that formed in colluvium derived mainly from quartzite and sandstone. These soils are on ridgetops and side slopes of ridges extending from the base of the Blue Ridge Mountains. Slopes range from 2 to 15 percent.

Laidig soils are commonly near Berks, Braddock, Dekalb, and Sequoia soils. Unlike Berks, Braddock, Dekalb, and Sequoia soils, Laidig soils have a fragipan. In addition, Laidig soils have a thicker solum, have fewer rock fragments in the subsoil, and are deeper to bedrock than Berks and Dekalb soils. They have less clay in the subsoil and generally are yellower in the subsoil than Braddock soils. They have a thicker solum and less clay in the subsoil than Sequoia soils.

Typical pedon of Laidig gravelly fine sandy loam, 2 to 7 percent slopes, 2,375 feet north and 250 feet east of the intersection of Virginia Routes 697 and 698, in woodland:

Oi—3 inches to 0; loose leaves, twigs, and partly decomposed organic material; common very fine roots.

A—0 to 7 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, medium, and coarse roots; 20 percent semirounded quartzite gravel; 5 percent quartzite cobbles; strongly acid; clear smooth boundary.

BA—7 to 11 inches; yellowish brown (10YR 5/6) loam; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and common fine and medium roots; very strongly acid; clear smooth boundary.

Bt1—11 to 27 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; slightly hard, friable, sticky, and slightly plastic; few very fine and common fine, medium, and coarse roots; many faint clay films; very strongly acid; clear smooth boundary.

Bt2—27 to 36 inches; yellowish brown (10YR 5/8) sandy clay loam; many medium faint yellowish red (5YR 5/8) and common fine distinct light yellowish brown (10YR 6/4) mottles; weak very coarse platy structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many faint clay films; horizon is slightly compact in place; very strongly acid; clear wavy boundary.

Bx—36 to 61 inches; mottled, yellowish red (5YR 5/8), strong brown (7.5YR 5/8), yellowish brown (10YR 5/8), light yellowish brown (10YR 6/4), and light brownish gray (10YR 6/2) sandy clay loam; weak very coarse prismatic structure parting to weak very coarse platy; firm and brittle; few fine roots; common faint clay films; horizon is slightly compact in place; very strongly acid; gradual smooth boundary.

C—61 to 72 inches; mottled, yellowish red (5YR 5/6), strong brown (7.5YR 5/6), very pale brown (10YR 7/3), light yellowish brown (10YR 6/4), and light gray (2.5Y 7/2) sandy clay loam; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; very strongly acid.

The solum is more than 60 inches thick. Depth to bedrock is more than 60 inches. Depth to the fragipan ranges from 30 to 50 inches. Unless the surface has been limed, reaction is very strongly acid or strongly acid. Coarse fragments range from 10 to 30 percent in the A horizon and from 0 to 15 percent in the other horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The BA horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. In some pedons it has mottles in the lower part. The horizon is clay loam or sandy clay loam.

The Bx horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 8. It is generally mottled. It is sandy clay loam or sandy loam.

The C horizon is commonly mottled. It has hue of 5YR to 10YR, value of 4 to 7, and chroma of 2 to 8. It is sandy clay loam or sandy loam.

## Madison Series

The Madison series consists of very deep, well drained soils that formed in weathered mica schist and mica gneiss. These soils are on Piedmont uplands. Slopes range from 15 to 40 percent.

Madison soils commonly are near Cecil, Cullen, Grover, Poindexter, Sweetapple, Turbeville, and Wateree soils. Madison soils have a thinner solum depth and more mica flakes in the subsoil than Cecil, Cullen, and Turbeville soils. They have more clay in the subsoil than Grover soils. They have a subsoil that is redder and has more clay than that of Sweetapple soils. They are deeper to bedrock, have a redder subsoil that has more clay and mica flakes, and are more acid throughout than

Poindexter soils. They have a subsoil that is redder and has more clay in the subsoil than Wateree soils.

Typical pedon of Madison sandy clay loam, 15 to 25 percent slopes, severely eroded, 625 feet east and 375 feet south of the intersection of Virginia Routes 724 and 722, in woodland:

Oi—3 inches to 0; loose leaves, twigs, pine needles, and partly decomposed organic material; few fine roots.

Ap1—0 to 1 inch; reddish brown (5YR 4/3) sandy clay loam; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; 10 percent quartz gravel; few medium flakes of mica; very strongly acid; abrupt smooth boundary.

Ap2—1 to 7 inches; reddish brown (5YR 4/4) sandy clay loam; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and common medium roots; 10 percent quartz gravel; few medium flakes of mica; very strongly acid; abrupt wavy boundary.

Bt—7 to 25 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; many distinct clay films on faces of peds; 5 percent quartz gravel; 5 percent crushable weathered mica gneiss; many medium flakes of mica; very strongly acid; clear wavy boundary.

BC—25 to 30 inches; red (2.5YR 4/6) loam; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; few fine and medium roots; common distinct clay films on faces of peds; 60 percent crushable weathered mica gneiss; many medium flakes of mica; very strongly acid; gradual wavy boundary.

C1—30 to 42 inches; multicolored, dark brown (7.5YR 3/2), yellowish red (5YR 5/8), and light yellowish brown (10YR 6/4) saprolite of mica gneiss that crushes to loam; massive; slightly hard, friable, slightly sticky and nonplastic; few fine roots; clay flows coat faces of rock; 5 percent quartz gravel; many medium flakes of mica; strongly acid; clear irregular boundary.

C2—42 to 72 inches; very dark grayish brown (10YR 3/2), dark brown (7.5YR 4/4), and pink (7.5YR 7/4) saprolite of mica gneiss that crushes to sandy loam; massive; soft, friable, nonsticky and nonplastic; few fine roots; many medium flakes of mica; strongly acid.

The solum is 20 to 40 inches thick. Depth to hard bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 15 percent in the A horizon. Content of mica flakes ranges from few to many in the upper horizons. Many mica flakes are in the lower part of the solum. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 3 to 6. It is sandy clay loam or clay loam.

The Bt horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8. It is clay or clay loam.

The BC horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. It is loam, clay loam, or sandy clay loam.

The C horizon is a soft, multicolored mica schist or mica gneiss that crushes to loam, fine sandy loam, or sandy loam.

## Manteo Series

The Manteo series consists of shallow, somewhat excessively drained soils that formed in weathered sericite schist. These soils are on Piedmont uplands. Slopes range from 15 to 60 percent.

Manteo soils are commonly near Nason and Tatum soils. Manteo soils have a thinner solum, are shallower to bedrock, and have a subsoil that has less clay and more rock fragments than Nason and Tatum soils. In addition, they have a yellower subsoil than Tatum soils.

Typical pedon of Manteo channery silt loam, 25 to 60 percent slopes, 3,500 feet south and 2,250 feet west of the intersection of Virginia Routes 733 and 834, in woodland:

Oi—4 inches to 0; loose leaves, pine needles, twigs, and partly decomposed organic material; many fine and few medium roots.

A—0 to 7 inches; yellowish brown (10YR 5/4) channery silt loam; weak medium granular structure; slightly hard, friable, sticky and slightly plastic; many fine, and few medium and coarse roots; 20 percent hard sericite schist channers; very strongly acid; clear wavy boundary.

Bw—7 to 17 inches; strong brown (7.5YR 5/6) very channery silt loam; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common fine, and few medium and coarse roots; 50 percent hard, sericite schist channers; very strongly acid; abrupt wavy boundary.

R—17 inches; hard, sericite schist bedrock.

The solum thickness and depth to bedrock range from 10 to 20 inches. Content of rock fragments ranges from 15 to 80 percent. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A, or Ap, horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 6. In the fine earth fraction it is silt loam or loam.

The Bw horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. In the fine earth fraction it is silt loam or loam.

Some pedons have a C horizon that is multicolored, weathered sericite schist.

## Mattaponi Series

The Mattaponi series consists of very deep, moderately well drained soils that formed in fluvial and marine sediments. These soils are on Piedmont uplands. Slopes range from 2 to 15 percent.

Mattaponi soils are commonly near Cecil, Helena, Madison, and Vance soils. Mattaponi soils formed in fluvial sediments and Helena soils formed in weathered granite and granite gneiss. They have fewer mica flakes in the subsoil and are yellower in the subsoil than Cecil and Madison soils. They are poorer drained than Vance soils and, unlike Vance soils, have gray mottles in the lower part of the subsoil.

Typical pedon of Mattaponi sandy loam, 2 to 7 percent slopes, 1,750 feet south and 1,125 feet west of the intersection of U.S. Highway 460 and Virginia Route 811, in a hayfield:

Ap—0 to 10 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; slightly hard, very friable, slightly sticky and nonplastic; common fine roots; 5 percent semirounded quartz gravel; very strongly acid; abrupt smooth boundary.

Bt1—10 to 22 inches, strong brown (7.5YR 5/6) clay; moderate medium subangular structure; slightly hard, firm, very sticky and slightly plastic; common fine roots; many faint clay films; 5 percent semirounded quartz gravel; very strongly acid; gradual wavy boundary.

Bt2—22 to 40 inches; strong brown (7.5YR 5/6) clay; common medium distinct yellowish brown (10YR 5/8) and red (2.5YR 4/6) mottles; weak coarse platy structure parting to weak medium subangular blocky; slightly hard, firm, sticky and slightly plastic; few fine roots; common faint clay films; 5 percent semirounded quartz gravel; very strongly acid; gradual wavy boundary.

Bt3—40 to 53 inches; strong brown (7.5YR 5/6) clay; many medium distinct yellowish brown (10YR 5/8) and red (10R 4/6) and common fine prominent light gray (10YR 7/2) mottles; weak coarse platy structure parting to weak medium subangular blocky; slightly hard, firm, sticky and slightly plastic; common distinct clay films; 5 percent semirounded quartz gravel; very strongly acid; gradual wavy boundary.

Bt4—53 to 72 inches; mottled, yellowish brown (10YR 5/6), light gray (10YR 7/2), and red (10R 4/6) sandy clay loam; weak coarse platy structure parting to weak medium subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; common distinct clay films; 5 percent semirounded quartz gravel; very strongly acid.

The solum is 30 to 60 or more inches thick. Depth to bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 10 percent. Unless the surface has been limed, reaction is strongly acid or very strongly acid. Content of rock fragments is 0 to 10 percent throughout.

The A horizon has a hue of 10YR, value of 4 to 6, and chroma of 2 to 6. It is sandy loam or sandy clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 8, and chroma of 2 to 8. It is clay or sandy clay loam.

## Mecklenburg Series

The Mecklenburg series are deep, well drained soils that formed in weathered greenstone, hornblende, or hornblende gneiss. These soils are on Piedmont uplands. Slopes range from 2 to 25 percent.

Mecklenburg soils are commonly near Cecil, Cullen, Iredell, Madison, and Poindexter soils. Mecklenburg soils have a thinner solum depth and a high base saturation than Cecil and Cullen soils. They have a lower base saturation and a redder clay subsoil than Iredell soils. They have fewer mica flakes in the subsoil and a higher base saturation than Madison soils. They have a lower base saturation and more clay in the subsoil than Poindexter soils.

Typical pedon of Mecklenburg loam, 7 to 15 percent slopes, 6,375 feet south and 10,125 feet east of the intersection of Virginia Routes 715 and 714, in woodland:

Oi—1 inch to 0; loose leaves, twigs, and pine needles.

Ap—0 to 5 inches; reddish brown (5YR 4/4) loam, moderate, medium granular structure; slightly hard, very friable, sticky and slightly plastic; common very fine, fine, medium and coarse roots; few rounded, black, crushable concretions; 10 percent quartz and hard hornblende gravel; slightly acid; clear smooth boundary.

Bt—5 to 17 inches; red (2.5YR 4/6) clay; moderate fine subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine and few medium and coarse roots; common faint clay films; few rounded, black, crushable concretions; 5 percent hard hornblende gneiss gravel; 15 percent multicolored, soft, weathered hornblende gneiss; moderately acid, clear wavy boundary.

BC—17 to 40 inches; yellowish red (5YR 4/6) clay loam; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and medium and common fine roots; common faint clay films; few rounded, black crushable concretions; 40 percent of horizon composed of multicolored soft, weathered hornblende gneiss; few fine mica flakes; neutral; clear wavy boundary.

Cr—40 to 72 inches; multicolored yellowish red (5YR 5/6), reddish yellow (7.5YR 6/8), black (10YR 2/1), and olive (5Y 5/3) weathered hornblende gneiss that crushes to fine sandy loam; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; clay flows coat faces of rock and fill cracks between rocks; few fine mica flakes; neutral.

The solum is 20 to 40 inches thick. Depth to soft bedrock is 40 to 60 inches. Angular quartz or hard, basic rock gravel ranges from 0 to 10 percent. Black concretions are few to common throughout the solum. Unless the surface has been limed, reaction ranges from moderately acid to neutral.

The A horizon has hue of 5YR, value of 4 or 5, and chroma of 3 to 6. It is loam or fine sandy loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8.

The BC horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8.

The C horizon is multicolored, weathered basic rock that crushes to loam, silty clay loam, or fine sandy loam.

## Nason Series

The Nason series consists of deep, well drained soils that formed in weathered sericite schist. These soils are on Piedmont uplands. Slopes range from 7 to 40 percent.

Nason soils commonly are near Manteo and Tatum soils. They are deeper to bedrock than Manteo soils and have a subsoil that has more clay and fewer coarse fragments than Manteo soils. They have a yellower subsoil than that of Tatum soils.

Typical pedon of Nason gravelly silt loam, 15 to 25 percent slopes, 1,250 feet east and 1,500 feet north of the intersection of Virginia Routes 733 and 834, in woodland:

Oi—3 inches to 0; loose leaves, pine needles, twigs, and partly decomposed organic material; many fine roots.

A—0 to 5 inches; strong brown (7.5YR 5/6) gravelly silt loam; moderate fine granular structure; soft, friable, sticky and slightly plastic; many fine, common medium, and few coarse roots; 20 percent quartz gravel; 5 percent hard sericite schist channers; very strongly acid; clear wavy boundary.

BE—5 to 8 inches; yellowish red (5YR 5/6) silty clay loam; weak fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common fine and few medium and coarse roots; many faint clay films; 10 percent quartz gravel; 4 percent hard sericite schist channers; very strongly acid; clear wavy boundary.

Bt1—8 to 17 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; slightly hard, firm, sticky and slightly plastic; common fine and few medium and coarse roots; many faint clay films; 10 percent hard sericite channers; 4 percent quartz gravel; very strongly acid; gradual wavy boundary.

Bt2—17 to 33 inches; yellowish red (5YR 5/8) silty clay; moderate medium subangular blocky structure; slightly hard, firm, sticky and slightly plastic; few fine, medium, and coarse roots; many faint clay films; 10 percent hard sericite schist channers; 4 percent quartz gravel; very strongly acid; clear wavy boundary.

BC—33 to 41 inches; yellowish red (5YR 5/8) channery silty clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many faint clay films; 30 percent hard sericite schist channers; very strongly acid; clear wavy boundary.

C—41 to 48 inches; red (2.5YR 4/8), pink (7.5YR 7/4), and yellowish brown (10YR 5/8) saprolite of sericite schist that crushes to channery silt loam; massive; hard, firm, slightly sticky and nonplastic; few fine roots; thin distinct yellowish red (5YR 5/8) clay flows coat rock faces; 30 percent hard sericite schist channers; very strongly acid; abrupt wavy boundary.

Cr—48 to 72 inches; red, pink, and yellowish brown fractured, sericite schist bedrock.

The solum is 25 to 50 inches thick. Depth to soft bedrock ranges from 40 to 60 inches. The A horizon is 5 to 30 percent rock fragments, by volume. The Bt horizon is 0 to 15 percent rock fragments, by volume. The BC horizon is [illegible] 30 percent rock fragments, by volume, and the C horizon is 15 to 40 percent. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A horizon has a hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. In the fine earth fraction it is silt loam or loam.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. In the fine earth fraction it is silt loam or loam.

The BE horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 or 8. It is silty clay loam or clay loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is silty clay, clay, silty clay loam, or clay loam.

The BC horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. In the fine earth fraction it is silty clay loam or clay loam.

The C horizon is multicolored sericite schist that, in the fine earth fraction, crushes to silt loam or loam.

## Poindexter Series

The Poindexter series consists of moderately deep, well drained soils that formed in weathered greenstone or hornblende gneiss. These soils are on Piedmont uplands. Slopes range from 7 to 60 percent.

Poindexter soils are commonly near Cullen, Iredell, Madison, and Mecklenburg soils. These soils have less clay in the subsoil and a higher base saturation than Cullen, Madison, and Mecklenburg soils. They have less clay in the subsoil and are shallower to hard bedrock than Iredell soils.

Typical pedon of Poindexter fine sandy loam, 15 to 25 percent slopes, 1,125 feet east and 500 feet north of the intersection of Virginia Routes 667 and 43, in woodland:

Oi—3 inches to 0; loose leaves, twigs, and partly decomposed organic material.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine granular structure; soft, very friable, sticky and nonplastic; many fine and common medium roots; 5 percent quartz gravel; strongly acid; clear smooth boundary.

E—2 to 9 inches; brown (10YR 4/3) fine sandy loam; moderate fine granular structure; slightly hard, friable, slightly sticky and nonplastic; many fine and common medium and coarse roots; 5 percent quartz gravel; moderately acid; clear wavy boundary.

BE—9 to 11 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, and few medium and coarse roots; common faint clay films; 15 percent soft weathered fragments of hornblende gneiss; moderately acid; clear wavy boundary.

Bt—11 to 22 inches; dark brown (7.5YR 4/4) sandy clay loam; strong medium subangular blocky structure; hard, firm, sticky and slightly plastic; common fine, and few medium and coarse roots; many faint clay films; 15 percent soft hornblende gneiss fragments; moderately acid; clear wavy boundary.

Cr—22 to 41 inches; multicolored, very dark grayish brown (10YR 3/2), yellowish brown (10YR 5/8), very pale brown (10YR 7/4), and olive (5Y 5/3) weathered basic rock that crushes to fine sandy loam; massive, hard, firm, slightly sticky and nonplastic; few fine roots between rock faces; thin clay flows coat rock faces; few medium flakes of mica; slightly acid; abrupt irregular boundary.

R—41 inches; hard, hornblende gneiss bedrock.

The solum is 18 to 36 inches thick. Depth to weathered bedrock ranges from 20 to 40 inches. Depth to hard bedrock ranges from 40 to 60 inches. Angular quartz and basic rock fragments make up 0 to 15 percent of the solum, by volume. Unless the surface has been limed, reaction ranges from strongly acid to neutral.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It is fine sandy loam or loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. It is fine sandy loam or loam.

The BE horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. It is fine sandy loam or loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. It is sandy clay loam or clay loam.

The Cr horizon is multicolored, weathered basic rock that crushes to fine sandy loam or loam.

## Sequoia Series

The Sequoia series consists of moderately deep, well drained soils that formed in weathered shale. These soils are on ridgetops and the sides of ridges at the base of the Blue Ridge Mountains in upper Goose Creek Valley in the western part of Bedford County. Slopes range from 7 to 25 percent.

Sequoia soils are commonly near Berks, Braddock, Laidig, and Thurmont soils. Sequoia soils are deeper to hard bedrock and have more clay and generally fewer rock fragments in the subsoil than Berks soils. They have a thinner solum and a yellower subsoil than Braddock soils. They have a thinner solum and more clay in the subsoil than Laidig soils and, unlike Laidig soils, do not have a fragipan. They have more clay in the subsoil than Thurmont soils.

Typical pedon of Sequoia loam, 7 to 15 percent slopes, 1,500 feet west and 4,750 feet south of the intersection of Virginia Routes 617 and 729, in woodland:

Oi—2 inches to 0; loose leaves, twigs, pine needles, and partly decomposed organic material.

A—0 to 6 inches; yellowish brown (10YR 5/4) loam; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine, common medium and coarse roots; 10 percent shale channers; very strongly acid; clear wavy boundary.

BE—6 to 10 inches; yellowish brown (10YR 5/8) clay loam; weak fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine and fine, and common medium and coarse roots; many faint clay films; 10 percent crushable shale channers; very strongly acid; clear wavy boundary.

Bt1—10 to 22 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; slightly hard, firm, sticky and slightly plastic; few very fine and fine, and common medium and coarse roots; many distinct clay films; 15 percent crushable shale channers; very strongly acid; clear wavy boundary.

Bt2—22 to 35 inches; strong brown (7.5YR 5/6) channery clay; moderate fine and medium subangular blocky structure; slightly hard, firm, sticky and slightly plastic; few fine and common medium and coarse roots; many distinct clay films; 25 percent crushable shale channers; strongly acid; clear wavy boundary.

BC—35 to 39 inches; strong brown (7.5YR 5/6) extremely channery silty clay loam; moderate fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few fine and common medium and coarse roots; many distinct clay films;

75 percent crushable shale; strongly acid; gradual irregular boundary.

Cr—39 to 72 inches; strong brown (7.5YR 5/8), light yellowish brown (10YR 6/4), and light gray (10YR 7/2) shale; rock faces coated with thin clay flows in cracks; some rock faces coated with black stains.

The solum and depth of soft bedrock range from 20 to 40 inches thick. Depth to hard bedrock is commonly more than 60 inches. Content of fragments of soft shale ranges from 0 to 10 percent in the A and E horizons and from 5 to 25 percent in the B horizon. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 5. It is loam or silt loam.

Some pedons have a E horizon that has hue of 10YR, value of 4 or 5, and chroma of 2 or 4. It is loam or silt loam.

The BE horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8. It is clay loam or silty clay loam.

The Bt horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. In the fine earth fraction it is clay or silty clay.

The BC horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 6 or 8, and, in some pedons, is mottled.

## State Series

The State series consists of very deep, well drained soils that formed in alluvial sediments deposited by floodwaters of streams. These soils are subject to rare flooding and are on the low terraces adjacent to flood plains of rivers and creeks in the Piedmont uplands. Slopes range from 2 to 6 percent.

State soils are commonly near Altavista, Chewacla, and Toccoa soils. Unlike State soils, Altavista and Chewacla soils have gray mottles in the upper part of the subsoil. Unlike Chewacla and Toccoa soils, State soils have an argillic horizon.

Typical pedon of State fine sandy loam, 2 to 7 percent slopes, 5,125 feet north and 750 feet east of the intersection of Virginia Routes 122 and 671, on the flood plain of the Big Otter River, in a hayfield:

Ap—0 to 11 inches; brown (10YR 4/3) fine sandy loam; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; 2 percent rounded gravel; few fine flakes of mica; moderately acid; abrupt smooth boundary.

BA—11 to 15 inches; strong brown (7.5YR 4/6) loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; few faint clay films; Ap horizon material coats some peds and root channels in upper part of horizon; few fine flakes of mica; strongly acid; clear smooth boundary.

Bt—15 to 32 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine and few fine roots; many distinct clay films; few fine flakes of mica; strongly acid; clear smooth boundary.

BC—32 to 39 inches; brown (7.5YR 4/4) sandy clay loam; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common faint clay films; few fine flakes of mica; strongly acid; clear smooth boundary.

C1—39 to 45 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; soft, very friable, slightly sticky and nonplastic; few very fine and fine roots; 5 percent rounded gravel up to 0.5 inch in diameter; strongly acid; abrupt smooth boundary.

C2—45 to 72 inches; multicolored very gravelly sand; single grain; loose, nonsticky and nonplastic; few very fine roots; 40 percent rounded gravel and 5 percent rounded cobbles; strongly acid.

The solum ranges from 35 to 60 inches thick. Depth to bedrock is more than 60 inches. Unless the surface has been limed, reaction is very strongly acid or strongly acid. Content of rock fragments ranges from 0 to 2 percent in the A and B horizons and from 0 to 15 percent in the C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 6. It is fine sandy loam or loam.

The BA horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 or 6.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. In some pedons the lower part of the horizon is mottled. The horizon is clay loam or sandy clay loam.

The BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 6. In some pedons it is mottled. It is sandy clay loam or loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 8, or it is mottled. In the fine earth fraction it is sand, loamy sand, or sandy loam.

## Sweetapple Series

The Sweetapple series are moderately deep, somewhat excessively drained soils that formed in weathered mica gneiss and mica schist. These soils are on Piedmont uplands. Slopes range from 15 to 60 percent.

Sweetapple soils are commonly near Grover, Madison, Poindexter, and Wateree soils. Sweetapple soils have less clay in the subsoil than Grover, Madison, and Poindexter soils. In addition, they are yellower in the subsoil than Madison soils, and have more mica flakes and a lower base saturation than Poindexter soils. They have more mica flakes in the subsoil than Wateree soils.

Typical pedon of Sweetapple fine sandy loam, 25 to 60 percent slopes, 625 feet south and 275 feet west of the intersection of Virginia Routes 737 and 732, in woodland:

Oi—3 inches to 0; loose leaves, twigs, and partly decomposed organic material.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine granular structure; soft, very friable, slightly sticky and nonplastic; many fine and few medium roots; 5 percent quartz gravel; common medium flakes of mica; strongly acid; abrupt wavy boundary.

A2—2 to 5 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many fine and few medium and coarse roots; 10 percent quartz gravel; common medium flakes of mica; strongly acid; clear wavy boundary.

Bw1—5 to 11 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many fine and few medium and coarse roots; 10 percent quartz gravel; 2 percent quartz cobbles; many medium flakes of mica; strongly acid; clear wavy boundary.

Bw2—11 to 17 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine and few medium and coarse roots; 5 percent quartz gravel; 2 percent quartz cobbles; many medium flakes of mica; strongly acid; clear wavy boundary.

C—17 to 39 inches; dark yellowish brown (10YR 4/6) and dark brown (10YR 3/3) saprolite of interbedded mica gneiss and mica schist that crushes to loamy coarse sand; massive; slightly hard, friable, nonsticky and nonplastic; few fine and medium roots; 5 percent quartz gravel; many medium flakes of mica; moderately acid; clear wavy boundary.

Cr—39 to 65 inches; dark brown (10YR 3/3 and 4/3) and yellowish brown (10YR 5/6) interbedded mica gneiss and mica schist that crushes to loamy coarse sand; massive; hard, firm, nonsticky and nonplastic; few fine roots between faces of rock; 5 percent quartz gravel; many medium flakes of mica; moderately acid; abrupt wavy boundary.

R—65 inches; multicolored, hard mica gneiss bedrock.

The solum is 15 to 30 inches thick. Depth to hard bedrock is more than 60 inches. Depth to the Cr horizon ranges from 20 to 40 inches. Content of rock fragments ranges from 0 to 15 percent. Reaction ranges from very strongly acid to moderately acid throughout.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 6.

Some pedons have a BA horizon that has hue of 10YR, value of 4 or 5, and chroma of 4 or 6.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6. It is fine sandy loam or loam.

Some pedons have a BC horizon that has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6.

The C horizon is weathered mica gneiss and mica schist. It has hue of 7.5YR or 10YR, value of 2 to 6, and chroma of 2 to 8. It crushes to loamy coarse sand or fine sandy loam.

## Tatum Series

The Tatum series consists of deep, well drained soils that formed in weathered sericite schist. These soils are on Piedmont uplands. Slopes range from 2 to 25 percent.

Tatum soils are commonly near Manteo and Nason soils. They have a thicker solum, are deeper to bedrock, and have a redder subsoil that has more clay and fewer rock fragments than that of Manteo soils. They also have a redder subsoil than Nason soils.

Typical pedon of Tatum gravelly loam, 2 to 7 percent slopes, 750 feet east and 375 feet south of the intersection of Virginia Routes 627 and 626, in woodland:

Oi—3 inches to 0; loose leaves, twigs, and partly decomposed organic material; many fine and few medium roots.

A—0 to 1 inch; brown (10YR 4/3) gravelly loam; weak fine granular structure; soft, friable, slightly sticky and nonplastic; many fine, few medium and coarse roots; 20 percent quartz gravel; very strongly acid; abrupt smooth boundary.

E—1 to 6 inches; light yellowish brown (10YR 6/4) gravelly loam; weak fine granular structure; slightly hard, friable, slightly sticky and nonplastic; many fine, few medium and coarse roots; 20 percent quartz gravel; very strongly acid; clear wavy boundary.

BE—6 to 9 inches; yellowish red (5YR 4/6) clay loam; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine, few medium and coarse roots; common faint clay films coat faces of peds; 5 percent quartz gravel; very strongly acid; clear wavy boundary.

Bt1—9 to 18 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; common fine, few medium and coarse roots; many faint clay films coat faces of peds; 5 percent quartz gravel; 1 percent crushable sericite schist channers; few very fine flakes of mica; very strongly acid; clear wavy boundary.

Bt2—18 to 38 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; common fine, few medium and coarse roots; many faint clay films coat faces of peds; 10 percent crushable sericite schist channers;

few very fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—38 to 43 inches; red (2.5YR 5/6) channery clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; few fine roots; many faint clay films coat faces of peds; 4 percent quartz gravel; 30 percent soft crushable sericite schist channers; few very fine flakes of mica; very strongly acid; clear wavy boundary.

Cr—43 to 72 inches; multicolored, partly weathered sericite schist that crushes to silt loam; massive; slightly hard, firm, nonsticky and nonplastic; few fine roots; thin clay flows coat faces of rocks; 10 percent angular quartz cobbles; 5 percent quartz gravel; common very fine mica flakes; strongly acid; abrupt wavy boundary.

R—72 inches; hard, sericite schist bedrock.

The solum is 25 to 50 inches thick. Depth to soft bedrock ranges from 40 to 60 inches. Rock fragments range from 0 to 35 percent, by volume. If the surface has not been limed, reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 4. In the fine earth fraction it is loam or silt loam.

The E horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6. In the fine earth fraction it is loam or silt loam.

The BE horizon has hue of 5YR, value of 4 or 5, and chroma of 6 or 8. In the fine earth fraction it is clay loam or silty clay loam.

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. In the fine earth fraction it is silty clay or clay.

The BC horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. In the fine earth fraction it is silty clay loam or clay loam.

## Thurmont Series

The Thurmont series consists of very deep, well drained soils that formed in colluvial sediments near the base of mountains. These soils are on the side slopes and the foot slopes of mountains and ridges in the Blue Ridge Mountains. Slopes range from 2 to 25 percent.

Thurmont soils are commonly near Braddock, Edneytown, Hayesville, and Sequoia soils. Thurmont soils have less clay in the subsoil and are yellower in the subsoil than Braddock soils. They formed in colluvial sediments, but Edneytown soils formed in weathered granite and granite gneiss. Thurmont soils have less clay in the subsoil than Hayesville and Sequoia soils. In addition, they have a thicker solum and are deeper to bedrock than Sequoia soils.

Typical pedon of Thurmont fine sandy loam, 2 to 7 percent slopes, about 3,000 feet east and 2,375 feet north of the intersection of Virginia Routes 680 and 695, in a hayfield:

Ap—0 to 11 inches; brown (10YR 4/3) fine sandy loam; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; 5 percent granite gravel; moderately acid; abrupt wavy boundary.

BA—11 to 16 inches; strong brown (7.5YR 4/6) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few faint clay films; 5 percent granite gravel; strongly acid; clear wavy boundary.

Bt1—16 to 34 inches; strong brown (7.5YR 5/6) clay loam; weak fine and medium subangular blocky structure; hard, friable, very sticky and slightly plastic; common very fine and fine roots; common faint clay films; 10 percent granite gravel and cobbles; strongly acid; clear wavy boundary.

Bt2—34 to 44 inches; strong brown (7.5YR 5/6), yellowish brown (10YR 5/4), yellowish red (5YR 4/6), and red (2.5YR 4/6) gravelly clay loam; moderate very coarse platy structure; hard, friable, sticky and slightly plastic; few very fine and fine roots; many distinct clay films; 20 percent quartz and granite gravel and cobbles; very strongly acid; clear wavy boundary.

BC—44 to 53 inches; brown (10YR 5/3), yellowish brown (10YR 5/8), light brownish gray (10YR 6/2), strong brown (7.5YR 5/6), and yellowish red (5YR 4/6) gravelly sandy clay loam; weak very coarse platy structure; hard, firm, slightly sticky and slightly plastic; common distinct clay films; 20 percent quartz and granite gravel and cobbles; very strongly acid; clear wavy boundary.

2C—53 to 72 inches; yellowish brown (10YR 5/6) very gravelly sandy loam; common medium distinct pale brown (10YR 6/3), grayish brown (10YR 5/2), strong brown (7.5YR 5/8), and yellowish red (5YR 4/6) mottles; massive; hard, friable, slightly sticky and slightly plastic; 50 percent quartz and granite gravel and cobbles; very strongly acid.

The solum is 40 to 60 inches or more. Depth to bedrock is more than 60 inches. Depth to a lithologic discontinuity ranges from 30 to 72 inches. Content of rock fragments ranges from 0 to 50 percent in the A and E horizons, from 0 to 35 percent in the B horizon, and from 0 to 50 percent in the C horizon. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A, or Ap, horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 6. In pedons where value is 3 and chroma is 2 or 3, the horizon is less than 6 inches thick. In the fine earth fraction the horizon is fine sandy loam or loam.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 6. In the fine earth fraction it is fine sandy loam or loam.

The BA or BE horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. In the fine earth fraction it is sandy clay loam or clay loam.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is commonly mottled in the lower part. In the fine earth fraction it is clay loam or sandy clay loam.

The BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 8, and is commonly mottled.

The C, or 2C, horizon is commonly streaked or mottled. In the fine earth fraction it is sandy loam or sandy clay loam.

## Toccoa Series

The Toccoa series consists of very deep, well drained soils that formed in recent alluvial sediments deposited by floodwaters of streams. These soils are on flood plains of creeks and rivers and are subject to frequent flooding. Slopes range from 0 to 2 percent.

Toccoa soils commonly are near Altavista, Chewacla, and State soils. Unlike Toccoa soils, Altavista, Chewacla and State soils do not have a subsoil. In addition, Toccoa soils are better drained than Altavista and Chewacla soils.

Typical pedon of Toccoa sandy loam, 0 to 2 percent slopes, 875 feet west and 100 feet south of the intersection of Virginia Routes 43 and 667, on the north side of the flood plain of Machine Creek, in pasture:

A1—0 to 2 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; common fine flakes of mica; slightly acid; abrupt smooth boundary.

A2—2 to 7 inches; reddish brown (5YR 4/4) sandy loam; weak medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and common medium roots; common fine flakes of mica; slightly acid; clear smooth boundary.

C1—7 to 38 inches; reddish brown (5YR 4/3) sandy loam; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; few black manganese concretions; many fine flakes of mica; ½- to 3-inch thick bedding planes of loamy fine sand; moderately acid; clear smooth boundary.

C2—38 to 60 inches; reddish brown (5YR 4/4) sandy loam; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; few black manganese concretions; many fine flakes of mica; 2-inch thick bedding planes of fine sandy loam; moderately acid; clear smooth boundary.

C3—60 to 72 inches; reddish brown (5YR 4/4) loam; few medium distinct brown (10YR 5/3) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; few black manganese concretions; many fine flakes of mica; strongly acid.

Depth to bedrock is more than 60 inches. Bedding planes and thin strata of sandy or loamy texture are throughout the C horizon. Few to many flakes of mica range in all horizons. Unless the surface has been limed, reaction ranges from strongly acid to slightly acid.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 or 4. It is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. Some pedons have gray mottles below a depth of 20 inches. Some pedons have gravelly or very gravelly strata generally below a depth of 40 inches. Typically, the horizon is sandy loam, but some pedons have thin horizons, generally less than 10 inches thick, of loam, loamy sand, sand, sandy clay loam, fine sandy loam, or clay loam.

## Turbeville Series

The Turbeville series consists of very deep, well drained soils that formed in old alluvial sediments. These soils are on Piedmont uplands. Slopes range from 2 to 25 percent.

Turbeville soils commonly are near Cecil, Cullen, and Madison soils. Turbeville soils have a thicker clay subsoil than Cecil, Cullen, and Madison soils. They have fewer flakes of mica in the subsoil than Cecil and Madison soils. In addition, they formed in alluvial sediments, but Cecil, Cullen, and Madison soils formed in the weathered products of rock.

Typical pedon of Turbeville fine sandy loam, 2 to 7 percent slopes, 1,735 feet east and 1,500 feet north of the intersection of Virginia Routes 811 and 623, in woodland:

Oi—2 inches to 0; loose pine needles and twigs.

Ap—0 to 9 inches; brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; slightly hard, friable, sticky and slightly plastic; common very fine and fine, and few medium and coarse roots; 2 percent quartz gravel; strongly acid; abrupt smooth boundary.

BA—9 to 12 inches; yellowish red (5YR 4/6) clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common fine and few medium roots; few faint clay films; few round black manganese accumulations; 2 percent quartz gravel; strongly acid; clear wavy boundary.

Bt1—12 to 24 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, firm, very sticky and slightly plastic; few very fine and fine roots; many faint clay films; few round black manganese accumulations; 2 percent quartz gravel; strongly acid; gradual wavy boundary.

Bt2—24 to 44 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; hard, firm, very sticky and slightly plastic; few very fine and fine roots; many distinct clay films; few round black manganese accumulations; 2 percent quartz gravel; horizon is compact in place; strongly acid; clear wavy boundary.

Bt3—44 to 58 inches; dark red (2.5YR 3/6) clay; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse platy structure parting to moderate medium subangular blocky; hard, firm, very sticky and slightly plastic; few very fine and fine roots; many distinct clay films; few round black manganese accumulations; 2 percent quartz gravel; horizon is compact in place; strongly acid; clear wavy boundary.

Bt4—58 to 72 inches; dark red (2.5YR 3/6) clay; common medium distinct yellowish brown (10YR 5/6) and few medium prominent light gray (N 7/0) mottles; coarse medium platy structure parting to moderate fine subangular blocky; hard, firm, sticky and slightly plastic; few very fine roots; common faint clay films; horizon is compact in place; strongly acid.

The solum depth ranges from 60 to 80 inches or more. Depth to bedrock is more than 60 inches. Quartz gravel or cobblestones range from 0 to 15 percent, by volume, throughout. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 2 to 4. It is fine sandy loam or loam.

The BA horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is clay loam or sandy clay loam.

The upper part of the Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. The lower part of the Bt horizon has hue of 2.5YR to 5YR, value of 3 or 4, and chroma of 4 to 8. In some pedons the horizon in the lower part is mottled. It is clay or clay loam.

## Vance Series

The Vance series consists of deep, well drained soils that formed in weathered granite gneiss, mica gneiss, and mica schist. These soils are on Piedmont uplands. Slopes range from 2 to 15 percent.

Vance soils are commonly near Cecil, Helena, Madison, and Mattaponi soils. Vance soils are more slowly permeable in the subsoil than Cecil soils, and have mixed mineralogy rather than kaolinitic mineralogy typical of Cecil soils. They are better drained and do not have gray mottles in the subsoil, which is typical of Helena soils. They have a subsoil with slower permeability and fewer mica flakes than Madison soils and have mixed mineralogy rather than kaolinitic mineralogy typical of Madison soils. They are better drained and do not have gray mottles in the lower part of the subsoil typical of Mattaponi soils.

Typical pedon of Vance fine sandy loam, 7 to 15 percent slopes, 2,625 feet east and 2,125 feet south of the intersection of Virginia Routes 43 and 707, in woodland:

Oi—3 inches to 0; loose leaves, twigs, pine needles, and partly decomposed organic material; common very fine and fine roots.

A—0 to 2 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine, fine, medium, and coarse roots; 5 percent quartz gravel; very strongly acid; abrupt smooth boundary.

E—2 to 12 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine, fine, medium, and coarse roots; 5 percent quartz gravel; strongly acid; clear wavy boundary.

BE—12 to 17 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine and fine, and few medium roots; 5 percent quartz gravel; many faint clay films; very strongly acid; clear wavy boundary.

Bt—17 to 24 inches; strong brown (7.5YR 5/8) clay; few fine distinct red (2.5YR 5/8) mottles in lower part of horizon; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; few very fine and fine roots; many faint clay films; few fine mica flakes; 5 percent quartz gravel; very strongly acid; gradual wavy boundary.

Bt2—24 to 35 inches; yellowish brown (10YR 5/8) clay; many medium distinct red (2.5YR 5/8) and common fine faint brownish yellow (10YR 6/6) mottles; weak very coarse platy structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; few fine roots; many distinct clay films; few fine mica flakes; 5 percent quartz gravel; very strongly acid; gradual wavy boundary.

Bt3—35 to 40 inches; yellowish brown (10YR 5/6) clay; many medium distinct red (2.5YR 5/8), common fine distinct very pale brown (10YR 7/3), and common fine faint brownish yellow (10YR 6/6) mottles; weak very coarse platy structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; few fine roots; many distinct clay films; few fine mica flakes; 5 percent quartz gravel; very strongly acid; clear wavy boundary.

Cr1—40 to 53 inches; yellowish brown (10YR 5/6), red (2.5YR 4/8), and very pale brown (10YR 8/3) highly weathered granite gneiss that crushes to sandy clay loam; massive; slightly hard, firm, sticky and slightly plastic; few fine roots; thin clay flows; few fine mica flakes; 5 percent quartz gravel; very strongly acid; clear wavy boundary.

Cr2—53 to 72 inches; white (10YR 8/2), brownish yellow (10YR 6/6), and red (2.5YR 5/6) weathered granite gneiss and mica gneiss that crush to sandy loam; massive; slightly hard and hard, firm, slightly sticky and slightly plastic; few fine roots; thin clay flows coat faces of rock; many fine mica flakes; 5 percent quartz gravel; very strongly acid.

The solum is 20 to 40 inches thick. Depth to soft bedrock ranges from 40 to 60 inches. Depth to hard bedrock is more than 60 inches. Content of rock fragments ranges from 0 to 15 percent throughout. Unless the surface has been limed, reaction is very strongly acid or strongly acid.

The A horizon has a hue of 10YR, value of 5 or 6, and chroma of 2 to 4.

The E horizon has a hue of 10YR, value of 5 or 6, and chroma of 2 to 4.

The BE horizon has a hue of 10YR, value of 4 or 5, and chroma of 4 to 8. It is sandy clay loam or clay loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8.

The C horizon is multicolored, granite gneiss, mica gneiss, and mica schist that crush to sandy loam, loam, sandy clay loam, or clay loam.

## Wateree Series

The Wateree series consists of moderately deep, excessively drained soils that formed in weathered granite and granite gneiss. These soils are on Piedmont uplands. Slopes range from 15 to 40 percent.

Wateree soils are commonly near Cecil, Grover, Madison, Poindexter, and Sweetapple soils. Wateree soils are yellower in the subsoil and have less clay than Cecil and Madison soils. They have fewer flakes of mica in the subsoil than Grover, Madison, and Sweetapple soils. They have less clay in the subsoil than Grover soils. They have less clay in the subsoil and a lower base saturation than Poindexter soils.

Typical pedon of Wateree fine sandy loam, 25 to 40 percent slopes, 3,250 feet west and 1,750 feet north of the intersection of Virginia Routes 637 and 670, in woodland:

Oi—3 inches to 0; loose leaves, twigs, and partly decomposed organic material.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine, few medium and coarse roots; few medium flakes of mica; 10 percent hard granite gneiss gravel; moderately acid; abrupt wavy boundary.

A2—2 to 6 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common fine, few medium and coarse roots; few medium flakes of mica; 12 percent quartz and granite gneiss gravel; very strongly acid; clear wavy boundary.

Bw—6 to 19 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine, few medium and coarse roots; few medium flakes of mica; 10 percent granite gneiss gravel; strongly acid; clear wavy boundary.

C—19 to 39 inches; very dark grayish brown (10YR 3/2), brown (10YR 4/3), and strong brown (7.5YR 5/6) saprolite of granite gneiss that crushes to sandy loam; massive; soft, friable, slightly sticky and nonplastic; few fine roots; common medium flakes of mica; strongly acid; gradual wavy boundary.

Cr—39 to 59 inches; strong brown (7.5YR 5/8), very dark grayish brown (10YR 3/2), and yellow (10YR 7/6) partly weathered granite gneiss that crushes to sandy loam; massive; hard, firm, slightly sticky and nonplastic; few fine roots in rock fractures; common medium flakes of mica; strongly acid; clear wavy boundary.

R—59 inches; hard granite gneiss bedrock.

The solum is 14 to 30 inches thick. Depth to soft bedrock ranges from 20 to 40 inches. Depth to hard bedrock ranges from 40 to 60 inches. Hard granite gneiss gravel ranges from 0 to 15 percent, by volume. Unless the surface has been limed, reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam or sandy loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8.

The C horizon is multicolored, weathered granite or granite gneiss that crushes to sandy loam.

# Formation of the Soils

## Factors of Soil Formation

The five major factors of soil formation are parent material, relief, climate, plants and animals, and time. Climate and plants and animals are the active forces in soil formation. Their effects on parent material are modified by relief and the length of time the parent material has been weathered. In some areas one factor may dominate in the formation of a soil and determine most of its properties. Normally, however, the interaction of all factors determines the kind of soil that forms.

### Parent Material

Parent material is the material in which a soil forms. The two broad classes of parent material in this survey area are residual material and transported material.

Residual material has weathered in place in the underlying bedrock. The characteristics of the residual parent material are directly related to the characteristics of the underlying bedrock.

Transported material includes alluvial sediments and colluvial sediments. These sediments were moved mainly by water and were laid down as unconsolidated deposits of sand, silt, clay, and rock fragments. Alluvial sediments were transported by floodwaters and deposited on the flood plains of streams. Colluvial sediments were deposted by gravity and water at the base of mountains or hills or at the base of mountains that no longer exist. The characteristics of transported materials are related to the characteristics of the soils or rocks from which the materials were washed.

The broad rock types in which the soils in the survey area formed are igneous, metamorphic, and sedimentary rocks.

Igneous rocks formed by the cooling and the solidification of molten rock material. Examples of igneous rocks in the county are granite and diabase.

Metamorphic rocks formed from preexisting rocks that were altered by heat and pressure. Examples of metamorphic rocks in the county include granite gneiss, biotite, muscovite, mica schist, mica gneiss, quartzite, sericite schist, phyllite, hornblende gneiss, and greenstone.

Sedimentary rocks formed from sediments deposited by water into the ocean that once covered the county many years ago. These sediments then became cemented together when the ocean receded and the sediments dried. Examples of sedimentary rocks in the county are shale, sandstone, and, in very small amounts, limestone.

The igneous, metamorphic, and sedimentary rocks are also classified as acidic or basic. This classification is dependent on the type and the amount of minerals in the rocks.

Granite and granitic gneiss weathered to form the parent material for Hayesville, Edneytown, Edneyville, Helena, Vance, and Wateree soils. Mica schist and mica gneiss weathered to form the parent material for Cecil, Madison, Grover, and Sweetapple soils. Sericite schist weathered to form Tatum, Nason, and Manteo soils. Phyllite weathered to form Gunstock soils. Sandstone and quartzite weathered to form Dekalb soils. Shale weathered to form Sequoia and Berks soils. Reaction of these soils commonly is very strongly acid or strongly acid. Hornblende gneiss, diabase, and greenstone weathered to form parent material for Cullen, Mecklenburg, Iredell, and Poindexter soils. Reaction of these soils commonly is moderately acid to neutral.

Mattaponi soils formed from marine sediments deposited into the ocean that once covered the county. Erosion has removed most of the marine sediments, but some remain on broad, nearly level or gently sloping rises on Piedmont uplands. Reaction of these soils commonly is very strongly acid or strongly acid. Toccoa and Chewacla soils formed in recently transported alluvial sediments deposited by floodwaters on the flood plains of streams. Altavista, State, and Turbeville soils, for example, formed mainly in older, transported alluvial sediments on stream terraces. Thurmont, Laidig, and Braddock soils, for example, formed mainly in transported colluvial sediments, which were moved by gravity and water and were deposited at the base of mountains and hills. Reaction of these soils commonly is very strongly acid or strongly acid.

### Relief

Relief affects the formation of soils by influencing the rate of surface runoff, quantity of water infiltration, soil temperature, and geologic erosion. Relief can alter the effects of climatic factors acting on the parent material, and several different kinds of soils may form from the same kind of parent material. Relief also affects the amount of radiant energy absorbed by the soils; radiant energy in turn affects the type of native vegetation that grows on the soils.

Relief in Bedford County ranges from nearly level to very steep. The nearly level soils are commonly on flood plains of streams and on low stream terraces. In most areas these soils are sometimes wet because of frequent flooding, the seasonal high water table, or slow surface runoff. These soils typically have gray mottles in the subsoil, which indicate the seasonal high water table. They are well drained to somewhat poorly drained. Toccoa and Chewacla soils are examples.

The gently sloping and strongly sloping soils are commonly well drained or moderately well drained. These soils are mostly on broad to narrow rises and ridgetops. Erosion is a slight hazard, surface runoff is medium or rapid, and water infiltrates easily. Clay and bases have translocated downward through these soils. Most of these soils have well defined soil horizons. Ashe, Berks, Edneyville, Manteo, Sweetapple, and Wateree soils are examples.

### Climate

Climate is one of the most influential factors in soil formation. It determines in large part the rate and degree of weathering. The weathering of parent material and minerals in the soils is more rapid and intense under the warm and humid climate of Bedford County than under a cold and dry climate. Climatic influences are expressed through or along with other soil-forming factors, especially in the weathering of parent material and the type and abundance of vegetation growing on a soil.

The climate of this survey area promotes the leaching of soluble minerals and the translocation of clay downward through the soil. Because of the abundance and infiltration of precipitation, clay has moved downward and accumulated in the subsoil of Cecil, Cullen, Madison, Braddock, and Tatum soils and many other soils in the county. Precipitation is also the prime factor in soil erosion.

Weathering, translocation of clay, and leaching of minerals in the soil material occur throughout most of each year. Climate activates these processes, which determine, to a large degree, the characteristics of most of the soils in the county.

Temperature is uniform throughout most of the county except for isolated areas because of elevation or the aspect of the landscape. For example, temperature is cooler at the higher elevations in the mountains, especially in the western and northern parts of the county. Because of the cooler temperatures, weathering of parent materials is slower and the accumulation of organic matter is much greater in some locations. These include the higher elevations on some of the less steep slopes and on ridgetops of some of the taller mountains. Rapid decomposition of organic matter occurs at the lower elevations throughout the county.

The climate is uniform throughout the county. Its effect on soil formation can be modified locally by the steepness and position of slopes. Local variation in climate can cause some variation among soils. However, variations resulting from climate alone are not great enough to account for the wide differences that exist among many soils in the county.

### Plants and Animals

Some of the plants and animals that are active in soil formation include trees, shrubs, grasses, burrowing animals, earthworms, and micro-organisms.

Plants are the major source of organic matter in the soils. Organic matter decomposes and is mixed into the soil mainly by the action of micro-organisms and earthworms. Plants also transfer plant nutrients from the lower layers of the soil to the upper layers as the organic matter decomposes. Rapid decomposition of organic matter caused by the warm temperatures, the generally abundant moisture, and the large population of micro-organisms in the soil has prevented the accumulation of large amounts of organic matter in most of the soils. However, because of the cooler temperatures, significantly higher amounts of organic matter have accumulated on some of the less sloping soils on some of the higher ridgetops.

Plant roots, burrowing animals, and earthworms have also moved and mixed some soil material. Tree roots have penetrated underlying cracked rocks and have broken them up into the parent material from which the soils have formed.

The vegetation in the survey area when the soil formed was mainly hardwood forest. Minor variations in the density of tree stands, the proportion of different species, and the kind of ground cover do not account for the major differences of the soils in the survey area.

The vegetation in the uncleared areas consists of stands of hardwoods, pines, and mixed hardwoods and pines. Hardwoods generally have a deeper root system than pines. The leaves of hardwoods vary in content of plant nutrients, but they generally return more bases and phosphorus to the soil than do pine needles.

The vegetation in the cleared areas of the county is mainly pasture that consists of fescue, orchardgrass, bermudagrass, clovers, and native grasses. Some areas are hayfields that consist mainly of orchardgrass and tall fescue.

Dairy cattle and beef cattle have returned to the soil in the form of manure large amounts of organic matter and plant nutrients. Many dairy farmers have installed manure holding systems. Periodically they remove this manure and spread it on cropland, hayland, or pasture.

Some plant nutrients in commercial fertilizer and lime applied on cropland, hayland, and pasture remain in the soil to increase soil fertility.

Some of the cleared land is used for cultivated crops, such as corn, corn silage, small grains, tobacco, and soybeans. Residue and stubble from these crops return organic matter and some plant nutrients to the soil.

Human activities, such as cultivation, artificial drainage, irrigation, applying lime and fertilizer, and changing the vegetation, have influenced the development of soils. Man has caused accelerated erosion and has changed and mixed soils in various engineering and construction projects.

### Time

Soils that formed in the same kind of parent material do not necessarily develop equally in the same length of time. For example, soils that formed in the same parent material, but that are different in relief or slope, commonly do not show the same degree of development in the same time span. Manteo and Tatum soils formed in the same kind of parent material over the same length of time, but have different characteristics. Manteo soils are moderately steep, steep, and verv steep. They have little soil development because surface runoff is very rapid and because erosion has removed some soil material before the soil layers had time to form. Tatum soils are gently sloping and strongly sloping. They have had time to develop well defined layers because of the decreased effects of surface runoff and less erosion.

Soils that formed in parent material resistant to weathering require more time to develop well defined horizons than soils that formed in easily weathered parent material. In soils on the flood plains of streams, the development of genetically related soil layers can also be slowed or prevented if alluvial sediments continue to be deposited.

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# Glossary

**ABC soil.** A soil having an A, a B, and a C horizon.

**Ablation till.** Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

**AC soil.** A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

**Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alkali (sodic) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Area reclaim** (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

**Association, soil.** A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

| | *Inches* |
|---|---|
| Very low | 0 to 3 |
| Low | 3 to 6 |
| Moderate | 6 to 9 |
| High | 9 to 12 |
| Very high | more than 12 |

**Basal till.** Compact glacial till deposited beneath the ice.

**Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

**Bedding planes.** Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eoli lacustrine, or marine sediments.

**Bedding system.** A drainage system made by plow grading, or otherwise shaping the surface of a f field. It consists of a series of low ridges separ by shallow, parallel dead furrows.

**Bedrock.** The solid rock that underlies the soil and unconsolidated material or that is exposed at th surface.

**Bench terrace.** A raised, level or nearly level strip earth constructed on or nearly on the contour, supported by a barrier of rocks or similar materi and designed to make the soil suitable for tillag and to prevent accelerated erosion.

**Bisequum.** Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

**Blowout.** A shallow depression from which all or mo the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles cobbles. In some blowouts the water table is exposed.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.

**Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated wi cold, dilute hydrochloric acid.

**Capillary water.** Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

**Carrying capacity.** The maximum stocking rate possi without inducing damage to vegetation or related resources. The rate may vary from year to year because of fluctuating forage production.

**Catena.** A sequence, or "chain," of soils on a landsca that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

**Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

**Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

**Catsteps.** Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

**Cement rock.** Shaly limestone used in the manufacture of cement.

**Channery soil.** A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

**Chiseling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

**Claypan.** A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

**Climax vegetation.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

**Coarse fragments.** If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

**Coarse textured soil.** Sand or loamy sand.

**Cobblestone (or cobble).** A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

**Colluvium.** Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

**Complex slope.** Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

**Complex, soil.** A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

**Compressible** (in tables). Excessive decrease in volume of soft soil under load.

**Concretions.** Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

**Congeliturbate.** Soil material disturbed by frost action.

**Conservation tillage.** A tillage and planting system in which crop residue covers at least 30 percent of the soil surface after planting. Where soil erosion by wind is the main concern, the system leaves the equivalent of at least 1,000 pounds per acre of flat small-grain residue on the surface during the critical erosion period.

**Consistence, soil.** The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

*Loose.*—Noncoherent when dry or moist; does not hold together in a mass.

*Friable.*—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

*Firm.*—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

*Plastic.*—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

*Sticky.*—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

*Hard.*—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

*Soft.*—When dry, breaks into powder or individual grains under very slight pressure.

*Cemented.*—Hard; little affected by moistening.

**Contour stripcropping.** Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Coprogenous earth (sedimentary peat).** Fecal material deposited in water by aquatic organisms.

**Corrosive.** High risk of corrosion to uncoated steel or deterioration of concrete.

**Cover crop.** A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

**Cutbanks cave** (in tables). The walls of excavations tend to cave in or slough.

**Decreasers.** The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

**Deferred grazing.** Postponing grazing or resting grazing land for a prescribed period.

**Dense layer** (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

**Depth to rock** (in tables). Bedrock is too near the surface for the specified use.

**Diversion (or diversion terrace).** A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Drainage class** (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained.*—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

*Somewhat excessively drained.*—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

*Well drained.*—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

*Moderately well drained.*—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

*Somewhat poorly drained.*—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

*Poorly drained.*—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

*Very poorly drained.*—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

**Drainage, surface.** Runoff, or surface flow of water, from an area.

**Drumlin.** A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

**Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

**Eolian soil material.** Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

*Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

*Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

**Erosion pavement.** A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

**Erosion potential.** A rating of soil erosion that can occur if a soil has no plant cover. The chief factors relating to erosion are rainfall (R factor), soil erodibility (K factor), soil loss tolerance (T factor), percentage of slope, and length of slope. Erosion potential in a map unit is rated low, medium, or high. A map unit with low erosion potential is not highly erodible, but some map units with low erosion potential need conservation measures to control erosion and to maintain productivity. A map unit with medium erosion potential consists of areas that have both low and high erosion potentials because of the variability of slope and of slope length. In these map units some areas require extensive conservation measures. A map unit with high erosion potential is highly erodible and requires extensive conservation measures to control erosion and to maintain productivity.

**Esker** (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

**Excess alkali** (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

**Excess fines** (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

**Excess lime** (in tables). Excess carbonates in the soil that restrict the growth of some plants.

**Excess salts** (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

**Excess sulfur** (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

**Fallow.** Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

**Fast intake** (in tables). The rapid movement of water into the soil.

**Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

**Fibric soil material (peat).** The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

**Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

**Fine textured soil.** Sandy clay, silty clay, and clay.

**First bottom.** The normal flood plain of a stream, subject to frequent or occasional flooding.

**Flagstone.** A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Foot slope.** The inclined surface at the base of a hill.

**Forb.** Any herbaceous plant not a grass or a sedge.

**Fragile** (in tables). A soil that is easily damaged by use or disturbance.

**Fragipan.** A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

**Frost action** (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

**Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

**Gilgai.** Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

**Glacial drift** (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

**Glacial outwash** (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

**Glacial till** (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

**Glaciofluvial deposits** (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

**Glaciolacustrine deposits.** Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

**Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

**Graded stripcropping.** Growing crops in strips that grade toward a protected waterway.

**Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

**Gravel.** Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

**Green manure crop** (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

**Ground water** (geology). Water filling all the unblocked pores of underlying material below the water table.

**Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Hardpan.** A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

**Hemic soil material (mucky peat).** Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

*O horizon.*—An organic layer of fresh and decaying plant residue.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon.*—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

*Cr horizon.*—Soft, consolidated bedrock beneath the soil.

*R layer.*—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

**Humus.** The well decomposed, more or less stable part of the organic matter in mineral soils.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

**Impervious soil.** A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

**Increasers.** Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

**Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

**Infiltration capacity.** The maximum rate at which water can infiltrate into a soil under a given set of conditions.

**Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

**Intake rate.** The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

| | |
|---|---|
| Less than 0.2 | very low |
| 0.2 to 0.4 | low |
| 0.4 to 0.75 | moderately low |
| 0.75 to 1.25 | moderate |
| 1.25 to 1.75 | moderately high |
| 1.75 to 2.5 | high |
| More than 2.5 | very high |

**Invaders.** On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

**Irrigation.** Application of water to soils to assist in production of crops. Methods of irrigation are—

*Border.*—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

*Basin.*—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

*Controlled flooding.*—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

*Corrugation.*—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

*Drip (or trickle).*—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

*Furrow.*—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

*Sprinkler.*—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

*Subirrigation.*—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

*Wild flooding.*—Water, released at high points, is allowed to flow onto an area without controlled distribution.

**Kame** (geology). An irregular, short ridge or hill of stratified glacial drift.

**Karst** (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

**Lacustrine deposit** (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

**Landslide.** The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

**Large stones** (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Loess.** Fine grained material, dominantly of silt-sized particles, deposited by wind.

**Low strength.** The soil is not strong enough to support loads.

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.

**Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

**Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

**Minimum tillage.** Only the tillage essential to crop production and prevention of soil damage.

**Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.

**Moderately coarse textured soil.** Coarse sandy loam, sandy loam, and fine sandy loam.

**Moderately fine textured soil.** Clay loam, sandy clay loam, and silty clay loam.

**Moraine** (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

**Muck.** Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

**Munsell notation.** A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

**Neutral soil.** A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition.

**Outwash, glacial.** Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial meltwater.

**Outwash plain.** A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

**Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**Peat.** Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The downward movement of water through the soil.

**Percs slowly** (in tables). The slow movement of water through the soil, adversely affecting the specified use.

**Permeability.** The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

| | |
|---|---|
| Very slow | less than 0.06 inch |
| Slow | 0.06 to 0.2 inch |
| Moderately slow | 0.2 to 0.6 inch |
| Moderate | 0.6 inch to 2.0 inches |
| Moderately rapid | 2.0 to 6.0 inches |
| Rapid | 6.0 to 20 inches |
| Very rapid | more than 20 inches |

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

**Piping** (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Plinthite.** The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed a heat from the sun. In a moist soil, plinthite can cut with a spade. It is a form of laterite.

**Plowpan.** A compacted layer formed in the soil below the plowed layer.

**Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

**Poor filter** (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

**Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Poor outlets** (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

| | *pH* |
|---|---|
| Extremely acid | below 4.5 |
| Very strongly acid | 4.5 to 5.0 |
| Strongly acid | 5.1 to 5.5 |
| Moderately acid | 5.6 to 6.0 |
| Slightly acid | 6.1 to 6.5 |
| Neutral | 6.6 to 7.3 |
| Mildly alkaline | 7.4 to 7.8 |

| | |
|---|---|
| Moderately alkaline | 7.9 to 8.4 |
| Strongly alkaline | 8.5 to 9.0 |
| Very strongly alkaline | 9.1 and higher |

**Regolith.** The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Residuum (residual soil material).** Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

**Rill.** A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

**Rippable.** Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Rooting depth** (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

**Saline soil.** A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sandstone.** Sedimentary rock containing dominantly sand-size particles.

**Sapric soil material (muck).** The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

**Saprolite** (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

**Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

**Seepage** (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

**Sequum.** A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

**Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Shale.** Sedimentary rock formed by the hardening of a clay deposit.

**Sheet erosion.** The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

**Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Silica.** A combination of silicon and oxygen. The mineral form is called quartz.

**Silica-sesquioxide ratio.** The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.

**Sinkhole.** A depression in the landscape where limestone has been dissolved.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

**Slickensides.** Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

**Slick spot.** A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

**Slippage** (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

**Slope** (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

**Sloughed till.** Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

**Slow intake** (in tables). The slow movement of water into the soil.

**Slow refill** (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

**Small stones** (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

| | *Millimeters* |
|---|---|
| Very coarse sand | 2.0 to 1.0 |
| Coarse sand | 1.0 to 0.5 |
| Medium sand | 0.5 to 0.25 |
| Fine sand | 0.25 to 0.10 |
| Very fine sand | 0.10 to 0.05 |
| Silt | 0.05 to 0.002 |
| Clay | less than 0.002 |

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

**Stone line.** A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

**Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.

**Stripcropping.** Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Stubble mulch.** Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Subsoiling.** Breaking up a compact subsoil by pulling a special chisel through the soil.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.

**Summer fallow.** The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

**Surface soil.** The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

**Taxadjuncts.** Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

**Terminal moraine.** A belt of thick glacial drift that generally marks the termination of important glacial advances.

**Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

**Terrace** (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

**Thin layer** (in tables). Otherwise suitable soil material too thin for the specified use.

**Till plain.** An extensive flat to undulating area underlain by glacial till.

**Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

**Toe slope.** The outermost inclined surface at the base of a hill; part of a foot slope.

**Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Toxicity** (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

**Trace elements.** Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

**Unstable fill** (in tables). Risk of caving or sloughing on banks of fill material.

**Upland** (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

**Valley fill.** In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

**Variant, soil.** A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

**Variegation.** Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

**Varve.** A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in glacial lake or other body of still water in front of a glacier.

**Weathering.** All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

**Well graded.** Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

**Wilting point (or permanent wilting point).** The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

# Tables

## TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1949-81 at Bedford, Virginia)

| Month | Temperature | | | | | | Precipitation | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average daily maximum | Average daily minimum | Average | 2 years in 10 will have-- | | Average number of growing degree days* | Average | 2 years in 10 will have-- | | Average number of days with 0.10 inch or more | Average snowfall |
| | | | | Maximum temperature higher than-- | Minimum temperature lower than-- | | | Less than-- | More than-- | | |
| | °F | °F | °F | °F | °F | Units | In | In | In | | In |
| January----- | 47.6 | 27.3 | 37.5 | 73 | 5 | 86 | 3.07 | 4.53 | 1.71 | 7 | 5.7 |
| February---- | 50.5 | 28.9 | 39.7 | 73 | 5 | 96 | 3.27 | 4.83 | 2.13 | 7 | 4.1 |
| March------- | 59.7 | 35.2 | 47.5 | 83 | 15 | 252 | 3.85 | 4.96 | 2.49 | 8 | 4.6 |
| April------- | 71.3 | 44.1 | 57.7 | 89 | 25 | 516 | 3.19 | 4.57 | 2.22 | 7 | 0 |
| May--------- | 77.8 | 52.9 | 65.4 | 92 | 33 | 772 | 4.00 | 5.00 | 2.29 | 8 | 0 |
| June-------- | 84.0 | 59.8 | 71.9 | 95 | 42 | 949 | 3.78 | 5.48 | 1.95 | 7 | 0 |
| July-------- | 86.8 | 63.7 | 75.3 | 98 | 50 | 1096 | 4.24 | 5.86 | 2.38 | 8 | 0 |
| August------ | 85.8 | 62.8 | 74.3 | 97 | 48 | 1055 | 3.71 | 5.20 | 2.08 | 7 | 0 |
| September--- | 79.6 | 56.5 | 68.1 | 93 | 36 | 826 | 3.52 | 4.96 | 1.53 | 6 | 0 |
| October----- | 69.7 | 45.5 | 57.6 | 86 | 25 | 544 | 3.43 | 5.10 | 1.66 | 5 | 0 |
| November---- | 59.1 | 36.1 | 47.6 | 80 | 14 | 260 | 2.79 | 4.01 | 1.37 | 5 | 1.9 |
| December---- | 49.5 | 29.3 | 39.4 | 71 | 8 | 99 | 3.09 | 4.84 | 1.67 | 6 | 2.6 |
| Yearly: | | | | | | | | | | | |
| Average--- | 63.3 | 45.0 | 56.7 | --- | --- | --- | --- | --- | --- | --- | --- |
| Extreme--- | --- | --- | --- | 104 | -1 | --- | --- | --- | --- | --- | --- |
| Total----- | --- | --- | --- | --- | --- | 6,551 | 41.96 | 59.34 | 23.48 | 81 | 18.9 |

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1949-81 at Bedford, Virginia)

| Probability | Temperature | | |
|---|---|---|---|
| | 24° F or lower | 28° F or lower | 32° F or lower |
| Last freezing temperature in spring: | | | |
| 1 year in 10 later than-- | Mar. 31 | Apr. 11 | May 11 |
| 2 years in 10 later than-- | Mar. 28 | Apr. 9 | Apr. 22 |
| 5 years in 10 later than-- | Mar. 17 | Mar. 31 | Apr. 10 |
| First freezing temperature in fall: | | | |
| 1 year in 10 earlier than-- | Nov. 6 | Oct. 8 | Oct. 8 |
| 2 years in 10 earlier than-- | Nov. 7 | Oct. 20 | Oct. 9 |
| 5 years in 10 earlier than-- | Nov. 20 | Nov. 4 | Oct. 25 |

TABLE 3.--GROWING SEASON

(Recorded in the period 1949-81 at Bedford, Virginia)

| Probability | Length of growing season if daily minimum temperature is-- | | |
|---|---|---|---|
| | Higher than 24° F | Higher than 28° F | Higher than 32° F |
| | Days | Days | Days |
| 9 years in 10 | 231 | 193 | 168 |
| 8 years in 10 | 235 | 200 | 180 |
| 5 years in 10 | 246 | 214 | 192 |
| 2 years in 10 | 276 | 245 | 209 |
| 1 year in 10 | 279 | 265 | 222 |

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

| Map symbol | Soil name | Acres | Percent |
|---|---|---|---|
| 1B | Altavista fine sandy loam, 2 to 7 percent slopes | 1,780 | 0.4 |
| 2D | Ashe gravelly sandy loam, 15 to 25 percent slopes, very stony | 200 | * |
| 2E | Ashe gravelly sandy loam, 25 to 60 percent slopes, very stony | 5,152 | 1.1 |
| 3C | Berks channery loam, 7 to 15 percent slopes | 491 | 0.1 |
| 3D | Berks channery loam, 15 to 25 percent slopes | 800 | 0.2 |
| 3E | Berks channery loam, 25 to 60 percent slopes | 1,962 | 0.4 |
| 4B | Braddock fine sandy loam, 2 to 7 percent slopes | 4,454 | 0.9 |
| 4C | Braddock fine sandy loam, 7 to 15 percent slopes | 7,974 | 1.7 |
| 4D | Braddock fine sandy loam, 15 to 25 percent slopes | 1,815 | 0.4 |
| 5B | Braddock cobbly fine sandy loam, 2 to 7 percent slopes | 380 | 0.1 |
| 5C | Braddock cobbly fine sandy loam, 7 to 15 percent slopes | 657 | 0.1 |
| 6C | Braddock fine sandy loam, 7 to 15 percent slopes, very stony | 1,838 | 0.4 |
| 6D | Braddock fine sandy loam, 15 to 25 percent slopes, very stony | 1,607 | 0.3 |
| 7B | Cecil fine sandy loam, 2 to 7 percent slopes | 40,717 | 8.7 |
| 7C | Cecil fine sandy loam, 7 to 15 percent slopes | 56,019 | 11.9 |
| 8A | Chewacla loam, 0 to 2 percent slopes | 3,023 | 0.6 |
| 9B | Cullen loam, 2 to 7 percent slopes | 4,981 | 1.1 |
| 9C | Cullen loam, 7 to 15 percent slopes | 4,769 | 1.0 |
| 9D | Cullen loam, 15 to 25 percent slopes | 1,286 | 0.3 |
| 10D | Dekalb very channery sandy loam, 15 to 25 percent slopes, very stony | 383 | 0.1 |
| 10E | Dekalb very channery sandy loam, 25 to 60 percent slopes, very stony | 1,385 | 0.3 |
| 11C | Edneytown loam, 7 to 15 percent slopes | 1,802 | 0.4 |
| 11D | Edneytown loam, 15 to 25 percent slopes | 5,578 | 1.2 |
| 11E | Edneytown loam, 25 to 60 percent slopes | 19,400 | 4.1 |
| 12C | Edneytown loam, 7 to 15 percent slopes, extremely stony | 2,317 | 0.5 |
| 12D | Edneytown loam, 15 to 25 percent slopes, extremely stony | 4,429 | 0.9 |
| 12E | Edneytown loam, 25 to 60 percent slopes, extremely stony | 29,792 | 6.3 |
| 13D | Edneyville gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony | 331 | 0.1 |
| 13E | Edneyville gravelly fine sandy loam, 25 to 60 percent slopes, extremely stony | 3,128 | 0.7 |
| 14C | Grover fine sandy loam, 7 to 15 percent slopes | 292 | 0.1 |
| 14D | Grover fine sandy loam, 15 to 25 percent slopes | 1,858 | 0.4 |
| 14E | Grover fine sandy loam, 25 to 40 percent slopes | 2,993 | 0.6 |
| 15C | Gunstock channery loam, 7 to 15 percent slopes | 311 | 0.1 |
| 15D | Gunstock channery loam, 15 to 25 percent slopes | 267 | 0.1 |
| 15E | Gunstock channery loam, 25 to 45 percent slopes | 867 | 0.2 |
| 16B | Hayesville loam, 2 to 7 percent slopes | 6,988 | 1.5 |
| 16C | Hayesville loam, 7 to 15 percent slopes | 34,954 | 7.4 |
| 16D | Hayesville loam, 15 to 25 percent slopes | 25,575 | 5.4 |
| 16E | Hayesville loam, 25 to 45 percent slopes | 12,929 | 2.7 |
| 17C | Hayesville loam, 7 to 15 percent slopes, very stony | 2,165 | 0.5 |
| 17D | Hayesville loam, 15 to 25 percent slopes, very stony | 2,856 | 0.6 |
| 17E | Hayesville loam, 25 to 45 percent slopes, very stony | 7,498 | 1.6 |
| 18B | Helena fine sandy loam, 2 to 7 percent slopes | 553 | 0.1 |
| 18C | Helena fine sandy loam, 7 to 15 percent slopes | 459 | 0.1 |
| 19B | Iredell fine sandy loam, 2 to 7 percent slopes | 2,469 | 0.5 |
| 19C | Iredell fine sandy loam, 7 to 15 percent slopes | 1,870 | 0.4 |
| 20B | Laidig gravelly fine sandy loam, 2 to 7 percent slopes | 554 | 0.1 |
| 20C | Laidig gravelly fine sandy loam, 7 to 15 percent slopes | 421 | 0.1 |
| 21D3 | Madison sandy clay loam, 15 to 25 percent slopes, severely eroded | 49,021 | 10.4 |
| 21E3 | Madison sandy clay loam, 25 to 40 percent slopes, severely eroded | 8,913 | 1.9 |
| 22D | Manteo channery silt loam, 15 to 25 percent slopes | 299 | 0.1 |
| 22E | Manteo channery silt loam, 25 to 60 percent slopes | 2,894 | 0.6 |
| 23B | Mattaponi sandy loam, 2 to 7 percent slopes | 756 | 0.2 |
| 23C | Mattaponi sandy loam, 7 to 15 percent slopes | 380 | 0.1 |
| 24B | Mecklenburg loam, 2 to 7 percent slopes | 1,558 | 0.3 |
| 24C | Mecklenburg loam, 7 to 15 percent slopes | 4,589 | 1.0 |
| 24D | Mecklenburg loam, 15 to 25 percent slopes | 3,069 | 0.7 |
| 25C | Nason gravelly silt loam, 7 to 15 percent slopes | 2,588 | 0.6 |
| 25D | Nason gravelly silt loam, 15 to 25 percent slopes | 5,014 | 1.1 |
| 25E | Nason gravelly silt loam, 25 to 40 percent slopes | 3,203 | 0.7 |
| 26C | Poindexter fine sandy loam, 7 to 15 percent slopes | 1,981 | 0.4 |
| 26D | Poindexter fine sandy loam, 15 to 25 percent slopes | 7,085 | 1.5 |

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

| Map symbol | Soil name | Acres | Percent |
|---|---|---|---|
| 26E | Poindexter fine sandy loam, 25 to 60 percent slopes | 4,331 | 0.9 |
| 27C | Sequoia loam, 7 to 15 percent slopes | 3,625 | 0.8 |
| 27D | Sequoia loam, 15 to 25 percent slopes | 2,601 | 0.6 |
| 28B | State fine sandy loam, 2 to 7 percent slopes | 1,527 | 0.3 |
| 29D | Sweetapple fine sandy loam, 15 to 25 percent slopes | 1,931 | 0.4 |
| 29E | Sweetapple fine sandy loam, 25 to 60 percent slopes | 3,099 | 0.7 |
| 30B | Tatum gravelly loam, 2 to 7 percent slopes | 619 | 0.1 |
| 30C | Tatum gravelly loam, 7 to 15 percent slopes | 6,651 | 1.4 |
| 30D | Tatum gravelly loam, 15 to 25 percent slopes | 3,069 | 0.7 |
| 31B | Thurmont fine sandy loam, 2 to 7 percent slopes | 702 | 0.1 |
| 31C | Thurmont fine sandy loam, 7 to 15 percent slopes | 2,246 | 0.5 |
| 31D | Thurmont fine sandy loam, 15 to 25 percent slopes | 336 | 0.1 |
| 32A | Toccoa sandy loam, 0 to 2 percent slopes | 9,066 | 1.9 |
| 33B | Turbeville fine sandy loam, 2 to 7 percent slopes | 3,697 | 0.8 |
| 33C | Turbeville fine sandy loam, 7 to 15 percent slopes | 2,731 | 0.6 |
| 33D | Turbeville fine sandy loam, 15 to 25 percent slopes | 259 | 0.1 |
| 34B | Vance fine sandy loam, 2 to 7 percent slopes | 352 | 0.1 |
| 34C | Vance fine sandy loam, 7 to 15 percent slopes | 1,240 | 0.3 |
| 35D | Wateree fine sandy loam, 15 to 25 percent slopes | 794 | 0.2 |
| 35E | Wateree fine sandy loam, 25 to 40 percent slopes | 2,396 | 0.5 |
|  | Water | 11,551 | 2.5 |
|  | Total | 488,902 | 100.0 |

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

| Map symbol | Soil name |
|---|---|
| 1B | Altavista fine sandy loam, 2 to 7 percent slopes |
| 4B | Braddock fine sandy loam, 2 to 7 percent slopes |
| 7B | Cecil fine sandy loam, 2 to 7 percent slopes |
| 8A | Chewacla loam, 0 to 2 percent slopes (where drained) |
| 9B | Cullen loam, 2 to 7 percent slopes |
| 16B | Hayesville loam, 2 to 7 percent slopes |
| 18B | Helena fine sandy loam, 2 to 7 percent slopes |
| 20B | Laidig gravelly fine sandy loam, 2 to 7 percent slopes |
| 23B | Mattaponi sandy loam, 2 to 7 percent slopes |
| 24B | Mecklenburg loam, 2 to 7 percent slopes |
| 28B | State fine sandy loam, 2 to 7 percent slopes |
| 31B | Thurmont fine sandy loam, 2 to 7 percent slopes |
| 32A | Toccoa sandy loam, 0 to 2 percent slopes (where protected from flooding or not frequently flooded during the growing season) |
| 33B | Turbeville fine sandy loam, 2 to 7 percent slopes |
| 34B | Vance fine sandy loam, 2 to 7 percent slopes |

## TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

| Soil name and map symbol | Land capability | Corn | Corn silage | Wheat | Barley | Alfalfa hay | Grass-legume hay | Pasture |
|---|---|---|---|---|---|---|---|---|
| | | Bu | Tons | Bu | Bu | Tons | Tons | AUM* |
| 1B-------------- Altavista | IIe | 125 | 25 | 70 | 75 | --- | 4.0 | 8.5 |
| 2D-------------- Ashe | VIs | --- | --- | --- | --- | --- | --- | 3.0 |
| 2E-------------- Ashe | VIIs | --- | --- | --- | --- | --- | --- | --- |
| 3C-------------- Berks | IVe | 70 | 14 | 25 | 30 | 3.0 | 2.5 | 5.5 |
| 3D-------------- Berks | VIe | --- | --- | 20 | 25 | 3.0 | 1.5 | 4.5 |
| 3E-------------- Berks | VIIe | --- | --- | --- | --- | --- | --- | 3.0 |
| 4B-------------- Braddock | IIe | 120 | 25 | 75 | 80 | 5.0 | 5.0 | 8.5 |
| 4C-------------- Braddock | IIIe | 115 | 23 | 70 | 75 | 4.5 | 4.5 | 8.0 |
| 4D-------------- Braddock | IVe | 100 | 20 | 60 | 65 | 4.0 | 4.0 | 7.0 |
| 5B-------------- Braddock | IIIs | 90 | 18 | 60 | 75 | 4.5 | 3.5 | 8.0 |
| 5C-------------- Braddock | IVs | 80 | 16 | 55 | 70 | 4.0 | 3.0 | 6.0 |
| 6C, 6D---------- Braddock | VIs | --- | --- | --- | --- | --- | --- | 4.0 |
| 7B-------------- Cecil | IIe | 110 | 22 | 70 | 75 | 4.5 | 3.5 | 8.0 |
| 7C-------------- Cecil | IIIe | 90 | 18 | 65 | 70 | 4.0 | 3.0 | 7.5 |
| 8A-------------- Chewacla | IIIw | 130 | 26 | --- | --- | --- | 3.5 | 8.5 |
| 9B-------------- Cullen | IIe | 120 | 24 | 75 | 80 | 5.0 | 3.8 | 9.1 |
| 9C-------------- Cullen | IIIe | 110 | 22 | 70 | 75 | 4.5 | 3.6 | 8.7 |
| 9D-------------- Cullen | IVe | 90 | 18 | 60 | 65 | 4.0 | 3.0 | 8.0 |
| 10D------------- Dekalb | VIs | --- | --- | --- | --- | --- | --- | --- |

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

| Soil name and map symbol | Land capability | Corn | Corn silage | Wheat | Barley | Alfalfa hay | Grass-legume hay | Pasture |
|---|---|---|---|---|---|---|---|---|
| | | Bu | Tons | Bu | Bu | Tons | Tons | AUM* |
| 10E-------------<br>Dekalb | VIIs | --- | --- | --- | --- | --- | --- | --- |
| 11C-------------<br>Edneytown | IIIe | 80 | 16 | 45 | 65 | 3.5 | 2.5 | 5.0 |
| 11D-------------<br>Edneytown | IVe | 70 | 14 | 40 | 55 | 3.0 | 2.0 | 4.5 |
| 11E-------------<br>Edneytown | VIe | --- | --- | --- | --- | --- | --- | 4.0 |
| 12C, 12D, 12E---<br>Edneytown | VIIs | --- | --- | --- | --- | --- | --- | --- |
| 13D, 13E--------<br>Edneyville | VIIs | --- | --- | --- | --- | --- | --- | --- |
| 14C-------------<br>Grover | IIIe | 80 | 16 | 40 | 55 | 2.5 | 2.5 | 5.0 |
| 14D-------------<br>Grover | IVe | 55 | 11 | 30 | 45 | 2.0 | 2.0 | 4.5 |
| 14E-------------<br>Grover | VIe | --- | --- | --- | --- | --- | --- | --- |
| 15C-------------<br>Gunstock | IVe | 80 | 16 | 40 | 55 | --- | 2.0 | 5.0 |
| 15D-------------<br>Gunstock | VIe | --- | --- | 30 | 45 | --- | 1.5 | 4.0 |
| 15E-------------<br>Gunstock | VIIe | --- | --- | --- | --- | --- | --- | 3.5 |
| 16B-------------<br>Hayesville | IIe | 100 | 20 | 75 | 80 | 4.0 | 3.6 | 8.0 |
| 16C-------------<br>Hayesville | IIIe | 90 | 18 | 70 | 70 | 3.8 | 3.4 | 7.5 |
| 16D-------------<br>Hayesville | IVe | 80 | 12 | 60 | 60 | 3.2 | 3.0 | 6.0 |
| 16E-------------<br>Hayesville | VIe | --- | --- | --- | --- | --- | --- | 5.0 |
| 17C, 17D--------<br>Hayesville | VIs | --- | --- | --- | --- | --- | --- | 5.0 |
| 17E-------------<br>Hayesville | VIIs | --- | --- | --- | --- | --- | --- | 4.0 |
| 18B-------------<br>Helena | IIe | 80 | 16 | 40 | 55 | --- | 3.5 | 5.8 |
| 18C-------------<br>Helena | IIIe | 70 | 14 | 35 | 50 | --- | 3.2 | 5.3 |
| 19B-------------<br>Iredell | IIe | 65 | 13 | 35 | 50 | --- | 2.5 | 5.0 |

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

| Soil name and map symbol | Land capability | Corn | Corn silage | Wheat | Barley | Alfalfa hay | Grass-legume hay | Pasture |
|---|---|---|---|---|---|---|---|---|
| | | Bu | Tons | Bu | Bu | Tons | Tons | AUM* |
| 19C-------------<br>Iredell | IIIe | 55 | 11 | 30 | 45 | --- | 2.0 | 4.5 |
| 20B-------------<br>Laidig | IIe | 100 | 20 | 40 | 50 | 4.0 | 3.0 | 7.0 |
| 20C-------------<br>Laidig | IIIe | 95 | 19 | 35 | 45 | 4.0 | 3.0 | 7.0 |
| 21D3------------<br>Madison | VIe | --- | --- | --- | --- | --- | 2.7 | 4.5 |
| 21E3------------<br>Madison | VIIe | --- | --- | --- | --- | --- | --- | --- |
| 22D, 22E--------<br>Manteo | VIIe | --- | --- | --- | --- | --- | --- | --- |
| 23B-------------<br>Mattaponi | IIe | 110 | 22 | 65 | 70 | 4.5 | 3.5 | 7.0 |
| 23C-------------<br>Mattaponi | IIIe | 100 | 20 | 60 | 65 | 4.0 | 3.0 | 6.0 |
| 24B-------------<br>Mecklenburg | IIe | 90 | 18 | 50 | 60 | 3.5 | 3.6 | 7.5 |
| 24C-------------<br>Mecklenburg | IIIe | 80 | 16 | 45 | 60 | 3.0 | 3.3 | 7.0 |
| 24D-------------<br>Mecklenburg | IVe | 65 | 13 | 35 | 50 | --- | 3.0 | 6.0 |
| 25C-------------<br>Nason | IIIe | 85 | 17 | 45 | 55 | --- | 2.5 | 5.5 |
| 25D-------------<br>Nason | IVe | 65 | 13 | 35 | 45 | --- | 2.5 | 5.0 |
| 25E-------------<br>Nason | VIe | --- | --- | --- | --- | --- | --- | 3.5 |
| 26C-------------<br>Poindexter | IVe | 50 | 10 | 50 | 45 | 2.0 | 1.7 | 4.4 |
| 26D-------------<br>Poindexter | VIe | --- | --- | --- | --- | --- | --- | 3.7 |
| 26E-------------<br>Poindexter | VIIe | --- | --- | --- | --- | --- | --- | --- |
| 27C-------------<br>Sequoia | IIIe | 65 | 13 | 45 | 65 | 2.7 | 2.5 | 5.5 |
| 27D-------------<br>Sequoia | IVe | 55 | 11 | 40 | 55 | 2.5 | 2.0 | 5.0 |
| 28B-------------<br>State | IIe | 120 | 25 | 60 | 75 | 4.0 | 5.0 | 9.5 |
| 29D-------------<br>Sweetapple | VIe | --- | --- | --- | --- | --- | --- | 3.5 |

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

| Soil name and map symbol | Land capability | Corn | Corn silage | Wheat | Barley | Alfalfa hay | Grass-legume hay | Pasture |
|---|---|---|---|---|---|---|---|---|
| | | Bu | Tons | Bu | Bu | Tons | Tons | AUM* |
| 29E-------------<br>Sweetapple | VIIe | --- | --- | --- | --- | --- | --- | --- |
| 30B-------------<br>Tatum | IIe | 90 | 18 | 50 | 65 | --- | 3.0 | 6.0 |
| 30C-------------<br>Tatum | IIIe | 85 | 17 | 45 | 60 | --- | 2.5 | 5.5 |
| 30D-------------<br>Tatum | IVe | 65 | 13 | 35 | 50 | --- | 2.0 | 5.0 |
| 31B-------------<br>Thurmont | IIe | 125 | 25 | 65 | 70 | 4.0 | 4.5 | 8.5 |
| 31C-------------<br>Thurmont | IIIe | 115 | 23 | 55 | 65 | 3.5 | 4.0 | 7.5 |
| 31D-------------<br>Thurmont | IVe | 100 | 20 | 45 | 55 | 3.0 | 4.0 | 7.5 |
| 32A-------------<br>Toccoa | IIIw | 125 | 25 | --- | --- | --- | 4.0 | 8.0 |
| 33B-------------<br>Turbeville | IIe | 120 | 24 | 75 | 85 | 4.5 | 4.0 | 8.5 |
| 33C-------------<br>Turbeville | IIIe | 110 | 22 | 70 | 75 | 4.5 | 3.5 | 8.0 |
| 33D-------------<br>Turbeville | IVe | 85 | 17 | 60 | 65 | 4.0 | 2.0 | 5.5 |
| 34B-------------<br>Vance | IIe | 80 | 14 | 60 | 65 | 2.5 | 4.8 | 8.0 |
| 34C-------------<br>Vance | IIIe | 75 | 13 | 55 | 55 | 2.0 | 4.6 | 7.5 |
| 35D-------------<br>Wateree | VIe | --- | --- | --- | --- | --- | --- | 3.0 |
| 35E-------------<br>Wateree | VIIe | --- | --- | --- | --- | --- | --- | --- |

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

## TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

| Soil name and map symbol | Ordination symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* | |
| 1B--------------<br>Altavista | 9W | Slight | Moderate | Slight | Severe | Loblolly pine------- | 91 | 9 | Loblolly pine, yellow-poplar, black walnut. |
| | | | | | | Shortleaf pine------ | 77 | 9 | |
| | | | | | | Sweetgum------------ | 84 | 6 | |
| 2D--------------<br>Ashe<br>(North aspect) | 3R | Moderate | Moderate | Moderate | Moderate | Northern red oak---- | 45 | 2 | Eastern white pine, shortleaf pine. |
| | | | | | | Shortleaf pine------ | 56 | 6 | |
| | | | | | | Virginia pine------- | 62 | 7 | |
| | | | | | | Eastern white pine-- | 90 | 12 | |
| | | | | | | Yellow-poplar------- | 78 | 5 | |
| 2D--------------<br>Ashe<br>(South aspect) | 3R | Moderate | Moderate | Moderate | Moderate | Northern red oak---- | 35 | 1 | Eastern white pine, shortleaf pine, Virginia pine. |
| | | | | | | Shortleaf pine------ | 49 | 5 | |
| | | | | | | Virginia pine------- | 56 | 6 | |
| | | | | | | Eastern white pine-- | 78 | 10 | |
| | | | | | | Yellow-poplar------- | 68 | 4 | |
| 2E--------------<br>Ashe<br>(North aspect) | 3R | Severe | Severe | Moderate | Moderate | Northern red oak---- | 45 | 2 | Eastern white pine, shortleaf pine. |
| | | | | | | Shortleaf pine------ | 56 | 6 | |
| | | | | | | Virginia pine------- | 62 | 7 | |
| | | | | | | Eastern white pine-- | 90 | 12 | |
| | | | | | | Yellow-poplar------- | 78 | 5 | |
| 2E--------------<br>Ashe<br>(South aspect) | 3R | Severe | Severe | Severe | Moderate | Northern red oak---- | 35 | 1 | Eastern white pine, shortleaf pine, Virginia pine. |
| | | | | | | Shortleaf pine------ | 49 | 5 | |
| | | | | | | Virginia pine------- | 56 | 6 | |
| | | | | | | Eastern white pine-- | 78 | 10 | |
| | | | | | | Yellow-poplar------- | 68 | 4 | |
| 3C--------------<br>Berks | 4F | Slight | Slight | Moderate | Slight | Northern red oak---- | 70 | 4 | Eastern white pine, shortleaf pine. |
| | | | | | | Black oak----------- | 70 | 4 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| 3D--------------<br>Berks<br>(North aspect) | 4F | Moderate | Moderate | Moderate | Slight | Northern red oak---- | 70 | 4 | Eastern white pine, shortleaf pine. |
| | | | | | | Black oak----------- | 70 | 4 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| 3D--------------<br>Berks<br>(South aspect) | 3F | Moderate | Moderate | Severe | Slight | Northern red oak---- | 60 | 3 | Virginia pine, eastern white pine, shortleaf pine. |
| | | | | | | Black oak----------- | 60 | 3 | |
| | | | | | | Virginia pine------- | 60 | 6 | |
| 3E--------------<br>Berks<br>(North aspect) | 4R | Severe | Severe | Moderate | Slight | Northern red oak---- | 70 | 4 | Eastern white, pine, shortleaf pine. |
| | | | | | | Black oak----------- | 70 | 4 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| 3E--------------<br>Berks<br>(South aspect) | 3R | Severe | Severe | Severe | Slight | Northern red oak---- | 60 | 3 | Virginia pine, eastern white pine, shortleaf pine. |
| | | | | | | Black oak----------- | 60 | 3 | |
| | | | | | | Virginia pine------- | 60 | 6 | |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns |  |  |  | Potential productivity |  |  | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
|  |  | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* |  |
| 4B, 4C----------<br>Braddock | 4C | Slight | Moderate | Slight | Slight | Northern red oak---- | 80 | 4 | Yellow-poplar, eastern white pine. |
|  |  |  |  |  |  | Yellow-poplar------- | 90 | 6 |  |
|  |  |  |  |  |  | Eastern white pine-- | 95 | 12 |  |
|  |  |  |  |  |  | Virginia pine------- | 76 | 8 |  |
|  |  |  |  |  |  | Shortleaf pine------ | 76 | 8 |  |
| 4D--------------<br>Braddock<br>(North aspect) | 4R | Moderate | Moderate | Slight | Slight | Northern red oak---- | 80 | 4 | Yellow-poplar, eastern white pine. |
|  |  |  |  |  |  | Yellow-poplar------- | 90 | 6 |  |
|  |  |  |  |  |  | Eastern white pine-- | 95 | 12 |  |
|  |  |  |  |  |  | Virginia pine------- | 76 | 8 |  |
|  |  |  |  |  |  | Shortleaf pine------ | 76 | 8 |  |
| 4D--------------<br>Braddock<br>(South aspect) | 4R | Moderate | Moderate | Moderate | Slight | Northern red oak---- | 70 | 4 | Shortleaf pine, eastern white pine. |
|  |  |  |  |  |  | Yellow-poplar------- | 80 | 5 |  |
|  |  |  |  |  |  | Eastern white pine-- | 85 | 11 |  |
| 5B, 5C----------<br>Braddock | 4C | Slight | Moderate | Slight | Slight | Northern red oak---- | 80 | 4 | Yellow-poplar, eastern white pine. |
|  |  |  |  |  |  | Yellow-poplar------- | 90 | 6 |  |
|  |  |  |  |  |  | Eastern white pine-- | 95 | 12 |  |
|  |  |  |  |  |  | Virginia pine------- | 76 | 8 |  |
|  |  |  |  |  |  | Shortleaf pine------ | 76 | 8 |  |
| 6C--------------<br>Braddock | 4C | Slight | Moderate | Slight | Slight | Northern red oak---- | 80 | 4 | Yellow-poplar, eastern white pine. |
|  |  |  |  |  |  | Yellow-poplar------- | 90 | 6 |  |
|  |  |  |  |  |  | Eastern white pine-- | 95 | 12 |  |
|  |  |  |  |  |  | Virginia pine------- | 76 | 8 |  |
|  |  |  |  |  |  | Shortleaf pine------ | 76 | 8 |  |
| 6D--------------<br>Braddock<br>(North aspect) | 4X | Moderate | Moderate | Slight | Slight | Northern red oak---- | 80 | 4 | Yellow-poplar, eastern white pine. |
|  |  |  |  |  |  | Yellow-poplar------- | 90 | 6 |  |
|  |  |  |  |  |  | Eastern white pine-- | 95 | 12 |  |
|  |  |  |  |  |  | Virginia pine------- | 76 | 8 |  |
|  |  |  |  |  |  | Shortleaf pine------ | 76 | 8 |  |
| 6D--------------<br>Braddock<br>(South aspect) | 4X | Moderate | Moderate | Moderate | Slight | Northern red oak---- | 70 | 4 | Shortleaf pine, eastern white pine. |
|  |  |  |  |  |  | Yellow-poplar------- | 80 | 5 |  |
|  |  |  |  |  |  | Eastern white pine-- | 85 | 11 |  |
| 7B, 7C----------<br>Cecil | 10A | Slight | Slight | Slight | Slight | Eastern white pine-- | 80 | 10 | Eastern white pine, loblolly pine, yellow-poplar. |
|  |  |  |  |  |  | Loblolly pine------- | 80 | 8 |  |
|  |  |  |  |  |  | Shortleaf pine------ | 69 | 8 |  |
|  |  |  |  |  |  | Virginia pine------- | 73 | 8 |  |
|  |  |  |  |  |  | Black oak----------- | 66 | 3 |  |
|  |  |  |  |  |  | Northern red oak---- | 82 | 4 |  |
|  |  |  |  |  |  | Post oak------------ | 65 | 3 |  |
|  |  |  |  |  |  | Scarlet oak--------- | 80 | 4 |  |
| 8A--------------<br>Chewacla | 9W | Slight | Moderate | Slight | Severe | Loblolly pine------- | 96 | 9 | Loblolly pine, yellow-poplar. |
|  |  |  |  |  |  | Yellow-poplar------- | 100 | 8 |  |
|  |  |  |  |  |  | Sweetgum------------ | 97 | 9 |  |
| 9B, 9C----------<br>Cullen | 8A | Slight | Slight | Slight | Slight | Loblolly pine------- | 80 | 8 | Loblolly pine, eastern white pine. |
|  |  |  |  |  |  | Shortleaf pine------ | 70 | 8 |  |
|  |  |  |  |  |  | Virginia pine------- | 70 | 8 |  |
|  |  |  |  |  |  | Yellow-poplar------- | 80 | 5 |  |
|  |  |  |  |  |  | White oak----------- | 60 | 3 |  |
|  |  |  |  |  |  | Northern red oak---- | 70 | 4 |  |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* | |
| 9D<br>Cullen<br>(North aspect) | 8C | Moderate | Moderate | Slight | Slight | Loblolly pine | 80 | 8 | Loblolly pine, eastern white pine. |
| | | | | | | Shortleaf pine | 70 | 8 | |
| | | | | | | Virginia pine | 70 | 8 | |
| | | | | | | Yellow-poplar | 80 | 5 | |
| | | | | | | White oak | 60 | 3 | |
| | | | | | | Northern red oak | 70 | 4 | |
| 9D<br>Cullen<br>(South aspect) | 6C | Moderate | Moderate | Slight | Sslight | Loblolly pine | 70 | 6 | Loblolly pine. |
| | | | | | | Shortleaf pine | 60 | 6 | |
| | | | | | | Virginia pine | 65 | 7 | |
| | | | | | | White oak | 60 | 3 | |
| | | | | | | Northern red oak | 60 | 3 | |
| 10D<br>Dekalb<br>(North aspect) | 2F | Moderate | Moderate | Moderate | Moderate | Northern red oak | 52 | 2 | Eastern white pine, Virginia pine, shortleaf pine. |
| 10D<br>Dekalb<br>(South aspect) | 2F | Moderate | Moderate | Severe | Moderate | Northern red oak | 45 | 2 | Eastern white pine, Virginia pine, shortleaf pine. |
| 10E<br>Dekalb<br>(North aspect) | 2R | Severe | Severe | Moderate | Moderate | Northern red oak | 52 | 2 | Eatern white pine, Virginia pine, shortleaf pine. |
| 10E<br>Dekalb<br>(South aspect) | 2R | Severe | Severe | Severe | Moderate | Northern red oak | 45 | 2 | Eastern white pine, Virginia pine, shortleaf pine. |
| 11C<br>Edneytown | 3A | Slight | Slight | Slight | Slight | Northern red oak | 60 | 3 | Shortleaf pine, eastern white pine, yellow-poplar. |
| | | | | | | Shortleaf pine | 70 | 8 | |
| | | | | | | Virginia pine | 70 | 8 | |
| | | | | | | Eastern white pine | 80 | 10 | |
| | | | | | | Yellow-poplar | 90 | 6 | |
| | | | | | | White oak | 60 | 3 | |
| 11D<br>Edneytown<br>(North aspect) | 3R | Moderate | Moderate | Slight | Slight | Northern red oak | 60 | 3 | Shortleaf pine, eastern white pine, yellow-poplar. |
| | | | | | | Shortleaf pine | 70 | 8 | |
| | | | | | | Virginia pine | 70 | 8 | |
| | | | | | | Eastern white pine | 80 | 10 | |
| | | | | | | Yellow-poplar | 90 | 6 | |
| | | | | | | White oak | 60 | 3 | |
| 11D<br>Edneytown<br>(South aspect) | 2R | Moderate | Moderate | Moderate | Slight | Northern red oak | 50 | 2 | Shortleaf pine, eastern white pine. |
| | | | | | | Eastern white pine | 70 | 8 | |
| | | | | | | Virginia pine | 60 | 6 | |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns |  |  |  | Potential productivity |  |  | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
|  |  | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* |  |
| 11E<br>Edneytown<br>(North aspect) | 3R | Severe | Severe | Slight | Slight | Northern red oak | 60 | 3 | Shortleaf pine, eastern white pine, yellow-poplar. |
|  |  |  |  |  |  | Shortleaf pine | 70 | 8 |  |
|  |  |  |  |  |  | Virginia pine | 70 | 8 |  |
|  |  |  |  |  |  | Eastern white pine | 80 | 10 |  |
|  |  |  |  |  |  | Yellow-poplar | 90 | 6 |  |
|  |  |  |  |  |  | White oak | 60 | 3 |  |
| 11E<br>Edneytown<br>(South aspect) | 2R | Severe | Severe | Moderate | Slight | Northern red oak | 50 | 2 | Shortleaf pine, eastern white pine. |
|  |  |  |  |  |  | Eastern white pine | 70 | 8 |  |
|  |  |  |  |  |  | Virginia pine | 60 | 6 |  |
| 12C<br>Edneytown | 3A | Slight | Slight | Slight | Slight | Northern red oak | 60 | 3 | Eastern white pine, shortleaf pine, yellow-poplar. |
|  |  |  |  |  |  | Shortleaf pine | 70 | 8 |  |
|  |  |  |  |  |  | Virginia pine | 70 | 8 |  |
|  |  |  |  |  |  | Eastern white pine | 80 | 10 |  |
|  |  |  |  |  |  | Yellow-poplar | 90 | 6 |  |
|  |  |  |  |  |  | White oak | 60 | 3 |  |
| 12D<br>Edneytown<br>(North aspect) | 3R | Moderate | Moderate | Slight | Slight | Northern red oak | 60 | 2 | Eastern white pine, shortleaf pine, yellow-poplar. |
|  |  |  |  |  |  | Shortleaf pine | 70 |  |  |
|  |  |  |  |  |  | Virginia pine | 70 |  |  |
|  |  |  |  |  |  | Eastern white pine | 80 |  |  |
|  |  |  |  |  |  | Yellow-poplar | 90 |  |  |
|  |  |  |  |  |  | White oak | 60 |  |  |
| 12D<br>Edneytown<br>(South aspect) | 2R | Moderate | Moderate | Moderate | Slight | Northern red oak | 50 | 2 | Shortleaf pine, eastern white pine. |
|  |  |  |  |  |  | Eastern white pine | 70 | 8 |  |
|  |  |  |  |  |  | Virginia pine | 60 | 6 |  |
| 12E<br>Edneytown<br>(North aspect) | 3R | Severe | Severe | Slight | Slight | Northern red oak | 60 | 3 | Eastern white pine, shortleaf pine, yellow-poplar. |
|  |  |  |  |  |  | Shortleaf pine | 70 | 8 |  |
|  |  |  |  |  |  | Virginia pine | 70 | 8 |  |
|  |  |  |  |  |  | Eastern white pine | 80 | 10 |  |
|  |  |  |  |  |  | Yellow-poplar | 90 | 90 |  |
| 12E<br>Edneytown<br>(South aspect) | 2R | Severe | Severe | Moderate | Slight | Northern red oak | 50 | 2 | Shortleaf pine, eastern white pine. |
|  |  |  |  |  |  | Eastern white pine | 70 | 8 |  |
|  |  |  |  |  |  | Virginia pine | 60 | 6 |  |
| 13D<br>Edneyville<br>(North aspect) | 4R | Moderate | Moderate | Slight | Slight | Northern red oak | 75 | 4 | Eastern white pine, shortleaf pine, yellow-poplar. |
|  |  |  |  |  |  | Yellow-poplar | 90 | 6 |  |
|  |  |  |  |  |  | Shortleaf pine | 60 | 6 |  |
|  |  |  |  |  |  | Virginia pine | 70 | 8 |  |
|  |  |  |  |  |  | Eastern white pine | 80 | 10 |  |
| 13D<br>Edneyville<br>(South aspect) | 3R | Moderate | Moderate | Moderate | Slight | Northern red oak | 65 | 3 | Eastern white pine, shortleaf pine. |
|  |  |  |  |  |  | Yellow-poplar | 85 | 6 |  |
|  |  |  |  |  |  | Shortleaf pine | 50 | 5 |  |
|  |  |  |  |  |  | Virginia pine | 60 | 6 |  |
|  |  |  |  |  |  | Eastern white pine | 70 | 8 |  |
| 13E<br>Edneyville<br>(North aspect) | 4R | Severe | Severe | Slight | Slight | Northern red oak | 75 | 4 | Eastern white pine, shortleaf pine, yellow-poplar. |
|  |  |  |  |  |  | Yellow-poplar | 90 | 6 |  |
|  |  |  |  |  |  | Shortleaf pine | 60 | 6 |  |
|  |  |  |  |  |  | Virginia pine | 70 | 8 |  |
|  |  |  |  |  |  | Eastern white pine | 80 | 10 |  |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordi-nation symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equip-ment limita-tion | Seedling mortal-ity | Wind-throw hazard | Common trees | Site index | Produc-tivity class* | |
| 13E-------------<br>Edneyville<br>(South aspect) | 3R | Severe | Severe | Moderate | Slight | Northern red oak----<br>Yellow-poplar-------<br>Shortleaf pine------<br>Virginia pine-------<br>Eastern white pine-- | 65<br>85<br>50<br>60<br>70 | 3<br>6<br>5<br>6<br>8 | Eastern white pine, shortleaf pine. |
| 14C-------------<br>Grover | 8A | Slight | Slight | Slight | Slight | Loblolly pine------- | 80 | 8 | Loblolly pine, Virginia pine. |
| 14D-------------<br>Grover<br>(North aspect) | 8A | Moderate | Moderate | Slight | Slight | Loblolly pine------- | 80 | 8 | Loblolly pine, Virginia pine. |
| 14D-------------<br>Grover<br>(South aspect) | 6C | Moderate | Moderate | Moderate | Slight | Loblolly pine------- | 70 | 6 | Loblolly pine, Virginia pine, yellow-poplar. |
| 14E-------------<br>Grover<br>(North aspect) | 8R | Severe | Severe | Slight | Slight | Loblolly pine------- | 80 | 8 | Loblolly pine, Virginia pine. |
| 14E-------------<br>Grover<br>(South aspect) | 7R | Severe | Severe | Moderate | Slight | Loblolly pine------- | 75 | 7 | Loblolly pine, Virginia pine. |
| 15C-------------<br>Gunstock | 3A | Slight | Slight | Slight | Moderate | Northern red oak----<br>Shortleaf pine------<br>Eastern white pine-- | 60<br>60<br>60 | 3<br>6<br>7 | Eastern white pine, shortleaf pine. |
| 15D-------------<br>Gunstock<br>(North aspect) | 3R | Moderate | Moderate | Slight | Moderate | Northern red oak----<br>Shortleaf pine------<br>Eastern white pine-- | 60<br>60<br>60 | 3<br>6<br>7 | Eastern white pine, shortleaf pine. |
| 15D-------------<br>Gunstock<br>(South aspect) | 2R | Moderate | Moderate | Moderate | Moderate | Northern red oak----<br>Shortleaf pine------<br>Eastern white pine-- | 50<br>50<br>50 | 2<br>5<br>5 | Shortleaf pine, eastern white pine. |
| 15E-------------<br>Gunstock<br>(North aspect) | 3R | Severe | Severe | Slight | Moderate | Northern red oak----<br>Shortleaf pine------<br>Eastern white pine-- | 60<br>60<br>60 | 3<br>6<br>7 | Eastern white pine, shortleaf pine. |
| 15E-------------<br>Gunstock<br>(South aspect) | 2R | Severe | Severe | Moderate | Moderate | Northern red oak----<br>Shortleaf pine------<br>Eastern white pine-- | 50<br>50<br>50 | 2<br>5<br>5 | Shortleaf pine, eastern white pine. |
| 16B, 16C--------<br>Hayesville | 4A | Slight | Slight | Slight | Slight | Northern red oak----<br>Eastern white pine--<br>Shortleaf pine------<br>Virginia pine------- | 70<br>92<br>69<br>70 | 4<br>12<br>8<br>8 | Shortleaf pine, eastern white pine. |
| 16D-------------<br>Hayesville<br>(North aspect) | 4R | Moderate | Moderate | Slight | Slight | Northern red oak----<br>Eastern white pine--<br>Shortleaf pine------<br>Virginia pine------- | 70<br>92<br>69<br>70 | 4<br>12<br>8<br>8 | Shortleaf pine, eastern white pine. |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* | |
| 16D------------- Hayesville (South aspect) | 3R | Moderate | Moderate | Moderate | Slight | Northern red oak---- | 60 | 3 | Shortleaf pine, eastern white pine. |
| | | | | | | Eastern white pine-- | 82 | 10 | |
| | | | | | | Shortleaf pine------ | 59 | 6 | |
| | | | | | | Virginia pine------- | 60 | 6 | |
| 16E------------- Hayesville (North aspect) | 4R | Severe | Severe | Slight | Slight | Northern red oak---- | 70 | 4 | Shortleaf pine, eastern white pine. |
| | | | | | | Eastern white pine-- | 92 | 12 | |
| | | | | | | Shortleaf pine------ | 69 | 8 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| 16E------------- Hayesville (South aspect) | 3R | Severe | Severe | Moderate | Slight | Northern red oak---- | 60 | 3 | Shortleaf pine, eastern white pine. |
| | | | | | | Eastern white pine-- | 82 | 10 | |
| | | | | | | Shortleaf pine------ | 59 | 6 | |
| | | | | | | Virginia pine------- | 60 | 6 | |
| 17C------------- Hayesville | 4A | Slight | Slight | Slight | Slight | Northern red oak---- | 70 | 4 | Eastern white pine, shortleaf pine. |
| | | | | | | Shortleaf pine------ | 69 | 8 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| | | | | | | Yellow-poplar------- | 93 | 7 | |
| 17D------------- Hayesville (North aspect) | 4R | Moderate | Moderate | Slight | Slight | Northern red oak---- | 70 | 4 | Eastern white pine, shortleaf pine. |
| | | | | | | Shortleaf pine------ | 69 | 8 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| | | | | | | Yellow-poplar------- | 93 | 7 | |
| 17D------------- Hayesville (South aspect) | 3R | Moderate | Moderate | Moderate | Slight | Northern red oak---- | 60 | 3 | Shortleaf pine, eastern white pine. |
| | | | | | | Shortleaf pine------ | 59 | 6 | |
| | | | | | | Virginia pine------- | 60 | 6 | |
| | | | | | | Yellow-poplar------- | 83 | 5 | |
| 17E------------- Hayesville (North aspect) | 4R | Severe | Severe | Slight | Slight | Northern red oak---- | 70 | 4 | Eastern white pine, shortleaf pine. |
| | | | | | | Shortleaf pine------ | 69 | 8 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| | | | | | | Yellow-poplar------- | 93 | 7 | |
| 17E------------- Hayesville (South aspect) | 3R | Severe | Severe | Moderate | Slight | Northern red oak---- | 60 | 3 | Shortleaf pine, eastern white pine. |
| | | | | | | Shortleaf pine------ | 59 | 6 | |
| | | | | | | Virginia pine------- | 60 | 6 | |
| | | | | | | Yellow-poplar------- | 83 | 5 | |
| 18B, 18C-------- Helena | 8W | Slight | Moderate | Slight | Slight | Loblolly pine------- | 80 | 8 | Loblolly pine, Virginia pine, yellow-poplar. |
| | | | | | | Shortleaf pine------ | 63 | 7 | |
| | | | | | | White oak----------- | 64 | 3 | |
| | | | | | | Yellow-poplar------- | 87 | 6 | |
| 19B, 19C-------- Iredell | 6C | Slight | Moderate | Moderate | Moderate | Loblolly pine------- | 67 | 3 | Loblolly pine, eastern redcedar. |
| | | | | | | Shortleaf pine------ | 58 | 6 | |
| | | | | | | Post oak------------ | 44 | 2 | |
| | | | | | | White oak----------- | 47 | 2 | |
| 20B, 20C-------- Laidig | 4A | Slight | Slight | Moderate | Moderate | Northern red oak---- | 71 | 4 | Eastern white pine, yellow-poplar. |
| | | | | | | Yellow-poplar------- | 89 | 6 | |
| | | | | | | Eastern white pine-- | 80 | 10 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| 21D3------------ Madison (North aspect) | 7R | Moderate | Moderate | Slight | Slight | Loblolly pine------- | 72 | 7 | Loblolly pine, Virginia pine. |
| | | | | | | Shortleaf pine------ | 66 | 7 | |
| | | | | | | Virginia pine------- | 66 | 7 | |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* | |
| 21D3------------<br>Madison<br>(South aspect) | 6R | Moderate | Moderate | Moderate | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine------- | 62<br>56<br>56 | 6<br>6<br>6 | Loblolly pine, Virginia pine. |
| 21E3------------<br>Madison<br>(North aspect) | 7R | Severe | Severe | Slight | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine------- | 73<br>66<br>66 | 7<br>7<br>7 | Loblolly pine, Virginia pine. |
| 21E3------------<br>Madison<br>(South aspect) | 6R | Severe | Severe | Moderate | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine------- | 62<br>56<br>56 | 6<br>6<br>6 | Loblolly pine, Virginia pine. |
| 22D-------------<br>Manteo<br>(North aspect) | 6D | Moderate | Moderate | Severe | Moderate | Loblolly pine-------<br>Virginia pine-------<br>Shortleaf pine------<br>Northern red oak---- | 70<br>65<br>60<br>65 | 6<br>7<br>6<br>3 | Loblolly pine, Virginia pine. |
| 22D-------------<br>Manteo<br>(South aspect) | 5D | Moderate | Moderate | Severe | Moderate | Loblolly pine-------<br>Virginia pine-------<br>Shortleaf pine------<br>Northern red oak---- | 60<br>55<br>50<br>55 | 5<br>6<br>5<br>3 | Loblolly pine, Virginia pine, shortleaf pine. |
| 22E-------------<br>Manteo<br>(North aspect) | 6R | Severe | Severe | Severe | Moderate | Loblolly pine-------<br>Virginia pine-------<br>Shortleaf pine------<br>Northern red oak---- | 70<br>65<br>60<br>65 | 6<br>7<br>6<br>3 | Loblolly pine, shortleaf pine. |
| 22E-------------<br>Manteo<br>(South aspect) | 5R | Severe | Severe | Severe | Moderate | Loblolly pine-------<br>Virginia pine-------<br>Shortleaf pine------<br>Northern red oak---- | 60<br>55<br>50<br>55 | 5<br>6<br>5<br>3 | Loblolly pine, Virginia pine, shortleaf pine. |
| 23B, 23C--------<br>Mattaponi | 8A | Slight | Slight | Slight | Slight | Loblolly pine-------<br>White oak-----------<br>Virginia pine------- | 80<br>70<br>70 | 8<br>4<br>8 | Loblolly pine, shortleaf pine. |
| 24B, 24C--------<br>Mecklenburg | 7A | Slight | Slight | Slight | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Northern red oak---- | 75<br>67<br>75 | 7<br>7<br>4 | Loblolly pine, Virginia pine. |
| 24D-------------<br>Mecklenburg<br>(North aspect) | 7R | Moderate | Moderate | Slight | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Northern red oak---- | 75<br>67<br>75 | 7<br>7<br>4 | Loblolly pine, Virginia pine. |
| 24D-------------<br>Mecklenburg<br>(South aspect) | 6R | Moderate | Moderate | Moderate | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Northern red oak---- | 65<br>57<br>65 | 6<br>6<br>3 | Loblolly pine, Virginia pine. |
| 25C-------------<br>Nason | 8A | Slight | Slight | Slight | Slight | Loblolly pine-------<br>Northern red oak----<br>Virginia pine-------<br>Shortleaf pine------ | 85<br>66<br>69<br>66 | 8<br>3<br>8<br>7 | Loblolly pine, Virginia pine. |
| 25D-------------<br>Nason<br>(North aspect) | 8R | Moderate | Moderate | Slight | Slight | Loblolly pine-------<br>Northern red oak----<br>Virginia pine-------<br>Shortlead pine------ | 85<br>66<br>69<br>66 | 8<br>3<br>8<br>7 | Loblolly pine, Virginia pine. |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* | |
| 25D-------------<br>Nason<br>(South aspect) | 7R | Moderate | Moderate | Moderate | Slight | Loblolly pine-------<br>Virginia pine-------<br>Shortleaf pine------<br>Northern red oak---- | 75<br>59<br>56<br>56 | 7<br>6<br>6<br>3 | Loblolly pine, Virginia pine. |
| 25E-------------<br>Nason<br>(North aspect) | 8R | Severe | Severe | Slight | Slight | Loblolly pine-------<br>Northern red oak----<br>Virginia pine-------<br>Shortleaf pine------ | 85<br>66<br>69<br>66 | 8<br>3<br>8<br>7 | Loblolly pine, Virginia pine. |
| 25E-------------<br>Nason<br>(South aspect) | 8R | Severe | Severe | Moderate | Slight | Loblolly pine-------<br>Virginia pine-------<br>Shortleaf pine------<br>Northern red oak---- | 75<br>59<br>56<br>56 | 8<br>16<br>6<br>3 | Loblolly pine, Virginia pine. |
| 26C-------------<br>Poindexter | 6A | Slight | Slight | Slight | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine-------<br>Southern red oak---- | 70<br>60<br>65<br>60 | 6<br>6<br>7<br>3 | Loblolly pine, shortleaf pine. |
| 26D-------------<br>Poindexter<br>(North aspect) | 6R | Moderate | Moderate | Slight | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine-------<br>Southern red oak---- | 70<br>60<br>65<br>60 | 6<br>6<br>7<br>3 | Loblolly pine, shortleaf pine. |
| 26D-------------<br>Poindexter<br>(South aspect) | 5R | Moderate | Moderate | Moderate | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine-------<br>Southern red oak---- | 60<br>50<br>55<br>50 | 5<br>5<br>6<br>2 | Loblolly pine, shortleaf pine. |
| 26E-------------<br>Poindexter<br>(North aspect) | 6R | Severe | Severe | Slight | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine-------<br>Southern red oak---- | 70<br>60<br>65<br>60 | 6<br>6<br>7<br>3 | Loblolly pine, shortleaf pine. |
| 26E-------------<br>Poindexter<br>(South aspect) | 5R | Severe | Severe | Moderate | Slight | Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine-------<br>Southern red oak---- | 60<br>50<br>55<br>50 | 5<br>5<br>6<br>2 | Loblolly pine, shortleaf pine. |
| 27C-------------<br>Sequoia | 4A | Slight | Slight | Slight | Slight | Northern red oak----<br>Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine------- | 70<br>83<br>63<br>71 | 4<br>8<br>7<br>8 | Loblolly pine, shortleaf pine, Virginia pine. |
| 27D-------------<br>Sequoia<br>(North aspect) | 4R | Moderate | Moderate | Slight | Slight | Northern red oak----<br>Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine------- | 70<br>83<br>63<br>71 | 4<br>8<br>7<br>8 | Loblolly pine, shortleaf pine, Virginia pine. |
| 27D-------------<br>Sequoia<br>(South aspect) | 3R | Moderate | Moderate | Moderate | Slight | Northern red oak----<br>Loblolly pine-------<br>Shortleaf pine------<br>Virginia pine------- | 60<br>73<br>55<br>60 | 3<br>7<br>5<br>6 | Loblolly pine, Virginia pine. |
| 28B-------------<br>State | 9A | Slight | Slight | Slight | Slight | Loblolly pine-------<br>Southern red oak----<br>Yellow-poplar-------<br>Virginia pine------- | 95<br>85<br>100<br>85 | 9<br>4<br>8<br>8 | Loblolly pine, yellow-poplar, loblolly pine. |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* | |
| 29D------------- Sweetapple (North aspect) | 6R | Moderate | Moderate | Slight | Slight | Loblolly pine------- | 70 | 6 | Loblolly pine, Virginia pine. |
| | | | | | | Shortleaf pine------ | 67 | 7 | |
| | | | | | | Northern red oak---- | 60 | 3 | |
| 29D------------- Sweetapple (South aspect) | 5R | Moderate | Moderate | Moderate | Slight | Loblolly pine------- | 60 | 5 | Loblolly pine, Virginia pine. |
| | | | | | | Shortleaf pine------ | 57 | 6 | |
| | | | | | | Northern red oak---- | 50 | 2 | |
| 29E------------- Sweetapple (North aspect) | 6R | Severe | Severe | Slight | Slight | Loblolly pine------- | 70 | 8 | Loblolly pine, Virginia pine. |
| | | | | | | Shortleaf pine------ | 67 | 7 | |
| | | | | | | Northern red oak---- | 60 | 3 | |
| 29E------------- Sweetapple (South aspect) | 5R | Severe | Severe | Moderate | Slight | Loblolly pine------- | 60 | 5 | Loblolly pine, Virginia pine. |
| | | | | | | Shortleaf pine------ | 57 | 6 | |
| | | | | | | Northern red oak---- | 50 | 2 | |
| 30B, 30C-------- Tatum | 8A | Slight | Slight | Slight | Slight | Loblolly pine------- | 78 | 8 | Loblolly pine, shortleaf pine. |
| | | | | | | Virginia pine------- | 68 | 7 | |
| | | | | | | Shortleaf pine------ | 68 | 7 | |
| | | | | | | Northern red oak---- | 72 | 4 | |
| | | | | | | Yellow-poplar------- | 83 | 5 | |
| 30D------------- Tatum (North aspect) | 8R | Moderate | Moderate | Slight | Slight | Loblolly pine------- | 78 | 8 | Loblolly pine, Virginia pine. |
| | | | | | | Virginia pine------- | 68 | 7 | |
| | | | | | | Shortleaf pine------ | 68 | 7 | |
| | | | | | | Northern red oak---- | 72 | 4 | |
| | | | | | | Yellow-poplar------- | 83 | 5 | |
| 30D------------- Tatum (South aspect) | 6R | Moderate | Moderate | Moderate | Slight | Loblolly pine------- | 68 | 6 | Loblolly pine, Virginia pine. |
| | | | | | | White oak----------- | 53 | 3 | |
| | | | | | | Chestnut oak-------- | 55 | 3 | |
| | | | | | | Virginia pine------- | 58 | 6 | |
| 31B, 31C-------- Thurmont | 4A | Slight | Slight | Slight | Slight | Northern red oak---- | 76 | 4 | Eastern white pine, yellow-poplar. |
| | | | | | | Yellow-poplar------- | 88 | 6 | |
| | | | | | | Eastern white pine-- | 88 | 11 | |
| | | | | | | Shortleaf pine------ | 77 | 9 | |
| 31D------------- Thurmont (North aspect) | 4R | Moderate | Moderate | Slight | Slight | Northern red oak---- | 76 | 4 | Eastern white pine, yellow-poplar. |
| | | | | | | Yellow-poplar------- | 88 | 6 | |
| | | | | | | Eastern white pine-- | 88 | 11 | |
| | | | | | | Shortleaf pine------ | 77 | 9 | |
| 31D------------- Thurmont (South aspect) | 3R | Moderate | Moderate | Moderate | Slight | Northern red pine--- | 66 | 3 | Eastern white pine, shortleaf pine. |
| | | | | | | Eastern white pine-- | 80 | 10 | |
| | | | | | | Shortlead pine------ | 66 | 7 | |
| 32A------------- Toccoa | 9A | Slight | Slight | Slight | Slight | Loblolly pine------- | 90 | 9 | Loblolly pine, yellow-poplar. |
| | | | | | | Yellow-poplar------- | 107 | 8 | |
| | | | | | | Sweetgum------------ | 100 | 10 | |
| 33B, 33C-------- Turbeville | 8A | Slight | Slight | Slight | Slight | Loblolly pine------- | 80 | 8 | Loblolly pine, yellow-poplar. |
| | | | | | | Yellow-poplar------- | 84 | 6 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| | | | | | | Shortleaf pine------ | 70 | 8 | |
| 33D------------- Turbeville (North aspect) | 8R | Moderate | Moderate | Slight | Slight | Loblolly pine------- | 80 | 8 | Loblolly pine, yellow-poplar. |
| | | | | | | Yellow-poplar------- | 84 | 6 | |
| | | | | | | Virginia pine------- | 70 | 8 | |
| | | | | | | Shortleaf pine------ | 70 | 8 | |

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Soil name and map symbol | Ordination symbol | Management concerns | | | | Potential productivity | | | Trees to plant |
|---|---|---|---|---|---|---|---|---|---|
| | | Erosion hazard | Equipment limitation | Seedling mortality | Windthrow hazard | Common trees | Site index | Productivity class* | |
| 33D-------------<br>Turbeville<br>(South aspect) | 6R | Moderate | Moderate | Moderate | Slight | Loblolly pine--------<br>Yellow-poplar--------<br>Shortleaf pine-------- | 70<br>78<br>60 | 6<br>5<br>6 | Loblolly pine,<br>Virginia pine,<br>yellow-poplar. |
| 34B, 34C--------<br>Vance | 7A | Slight | Slight | Slight | Slight | Loblolly pine-------- | 76 | 7 | Loblolly pine,<br>Virginia pine,<br>yellow-poplar. |
| 35D-------------<br>Wateree<br>(North aspect) | 7R | Moderate | Moderate | Slight | Slight | Loblolly pine--------<br>Shortleaf pine--------<br>Yellow-poplar--------<br>Virginia pine--------<br>White oak------------ | 77<br>69<br>88<br>71<br>68 | 7<br>8<br>6<br>8<br>4 | Loblolly pine,<br>Virginia pine,<br>yellow-poplar. |
| 35D-------------<br>Wateree<br>(South aspect) | 6R | Moderate | Moderate | Moderate | Slight | Loblolly pine--------<br>Shortleaf pine--------<br>Yellow-poplar--------<br>Virginia pine--------<br>White oak------------ | 67<br>59<br>78<br>60<br>58 | 6<br>6<br>5<br>6<br>3 | Virginia pine,<br>loblolly pine. |
| 35E-------------<br>Wateree<br>(North aspect) | 7R | Severe | Severe | Slight | Slight | Loblolly pine--------<br>Shortleaf pine--------<br>Yellow-poplar--------<br>Virginia pine--------<br>White oak------------ | 77<br>69<br>88<br>71<br>68 | 7<br>8<br>6<br>8<br>4 | Loblolly pine,<br>Virginia pine,<br>yellow-poplar. |
| 35E-------------<br>Wateree<br>(South aspect) | 6R | Severe | Severe | Moderate | Slight | Loblolly pine--------<br>Shortleaf pine--------<br>Yellow-poplar--------<br>Virginia pine--------<br>White oak------------ | 67<br>59<br>78<br>60<br>58 | 6<br>6<br>5<br>6<br>3 | Virginia pine,<br>loblolly pine. |

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* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

## TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails | Golf fairways |
|---|---|---|---|---|---|
| 1B-----------------------<br>Altavista | Severe:<br>flooding. | Moderate:<br>wetness. | Moderate:<br>slope,<br>wetness. | Moderate:<br>wetness. | Moderate:<br>wetness. |
| 2D-----------------------<br>Ashe | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 2E-----------------------<br>Ashe | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 3C-----------------------<br>Berks | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>small stones,<br>slope. | Moderate:<br>slope. | Severe:<br>slope,<br>small stones. |
| 3D, 3E-----------------<br>Berks | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>small stones,<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. |
| 4B-----------------------<br>Braddock | Slight----------- | Slight----------- | Moderate:<br>slope,<br>small stones. | Slight----------- | Slight. |
| 4C-----------------------<br>Braddock | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight----------- | Moderate:<br>slope. |
| 4D-----------------------<br>Braddock | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 5B-----------------------<br>Braddock | Moderate:<br>large stones,<br>small stones. | Moderate:<br>large stones,<br>small stones. | Severe:<br>large stones,<br>small stones. | Moderate:<br>large stones. | Severe:<br>large stones. |
| 5C-----------------------<br>Braddock | Moderate:<br>slope,<br>large stones,<br>small stones. | Moderate:<br>slope,<br>large stones,<br>small stones. | Severe:<br>large stones,<br>slope,<br>small stones. | Moderate:<br>large stones. | Severe:<br>large stones. |
| 6C-----------------------<br>Braddock | Moderate:<br>slope,<br>large stones. | Moderate:<br>slope,<br>large stones. | Severe:<br>large stones,<br>slope. | Slight----------- | Moderate:<br>slope,<br>large stones. |
| 6D-----------------------<br>Braddock | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>large stones,<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 7B-----------------------<br>Cecil | Slight----------- | Slight----------- | Moderate:<br>slope,<br>small stones. | Slight----------- | Slight. |
| 7C-----------------------<br>Cecil | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight----------- | Slight. |
| 8A-----------------------<br>Chewacla | Severe:<br>flooding,<br>wetness. | Severe:<br>wetness. | Severe:<br>wetness. | Severe:<br>wetness. | Severe:<br>wetness. |
| 9B-----------------------<br>Cullen | Slight----------- | Slight----------- | Moderate:<br>slope,<br>small stones. | Slight----------- | Slight. |

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails | Golf fairways |
|---|---|---|---|---|---|
| 9C<br>Cullen | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Severe:<br>erodes easily. | Moderate:<br>slope. |
| 9D<br>Cullen | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>erodes easily. | Severe:<br>slope. |
| 10D<br>Dekalb | Severe:<br>slope,<br>small stones. | Severe:<br>slope,<br>small stones. | Severe:<br>slope,<br>small stones,<br>large stones. | Moderate:<br>slope,<br>large stones. | Severe:<br>slope,<br>small stones. |
| 10E<br>Dekalb | Severe:<br>slope,<br>small stones. | Severe:<br>slope,<br>small stones. | Severe:<br>slope,<br>small stones,<br>large stones. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. |
| 11C, 11D<br>Edneytown | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 11E<br>Edneytown | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 12C<br>Edneytown | Severe:<br>large stones. | Severe:<br>large stones. | Severe:<br>large stones. | Slight | Moderate:<br>large stones,<br>slope. |
| 12D<br>Edneytown | Severe:<br>slope,<br>large stones. | Severe:<br>slope,<br>large stones. | Severe:<br>large stones. | Moderate:<br>slope. | Severe:<br>slope,<br>large stones. |
| 12E<br>Edneytown | Severe:<br>slope,<br>large stones. | Severe:<br>slope,<br>large stones. | Severe:<br>large stones. | Severe:<br>slope. | Severe:<br>slope,<br>large stones. |
| 13D<br>Edneyville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. | Moderate:<br>slope,<br>large stones. | Severe:<br>slope,<br>large stones. |
| 13E<br>Edneyville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. | Severe:<br>slope. | Severe:<br>slope,<br>large stones. |
| 14C<br>Grover | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 14D<br>Grover | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 14E<br>Grover | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 15C<br>Gunstock | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 15D<br>Gunstock | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 15E<br>Gunstock | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 16B<br>Hayesville | Slight | Slight | Moderate:<br>slope. | Slight | Slight. |

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails | Golf fairways |
|---|---|---|---|---|---|
| 16C, 16D<br>Hayesville | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 16E<br>Hayesville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 17C, 17D<br>Hayesville | Moderate:<br>slope,<br>large stones. | Moderate:<br>slope. | Severe:<br>large stones,<br>slope. | Slight | Moderate:<br>large stones,<br>slope. |
| 17F<br>Hayesville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>large stones,<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 18B<br>Helena | Moderate:<br>wetness,<br>percs slowly. | Moderate:<br>wetness. | Moderate:<br>wetness,<br>slope. | Moderate:<br>wetness. | Moderate:<br>wetness. |
| 18C<br>Helena | Moderate:<br>slope,<br>wetness,<br>percs slowly. | Moderate:<br>slope,<br>wetness. | Severe:<br>slope. | Moderate:<br>wetness. | Moderate:<br>wetness,<br>slope. |
| 19B<br>Iredell | Severe:<br>wetness. | Moderate:<br>wetness. | Severe:<br>wetness. | Moderate:<br>wetness. | Moderate:<br>wetness. |
| 19C<br>Iredell | Severe:<br>wetness. | Moderate:<br>slope,<br>wetness. | Severe:<br>slope,<br>wetness. | Moderate:<br>wetness. | Moderate:<br>wetness,<br>slope. |
| 20B<br>Laidig | Moderate:<br>small stones. | Moderate:<br>small stones. | Severe:<br>small stones. | Slight | Moderate:<br>small stones. |
| 20C<br>Laidig | Moderate:<br>slope,<br>small stones. | Moderate:<br>slope,<br>small stones. | Severe:<br>slope,<br>small stones. | Slight | Moderate:<br>small stones,<br>slope. |
| 21D3<br>Madison | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 21E3<br>Madison | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 22D<br>Manteo | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope,<br>depth to rock. | Severe:<br>small stones,<br>slope,<br>depth to rock. | Moderate:<br>slope. | Severe:<br>slope,<br>thin layer. |
| 22E<br>Manteo | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope,<br>depth to rock. | Severe:<br>small stones,<br>slope,<br>depth to rock. | Severe:<br>slope. | Severe:<br>slope,<br>thin layer. |
| 23B<br>Mattaponi | Moderate:<br>percs slowly. | Moderate:<br>percs slowly. | Moderate:<br>slope,<br>percs slowly. | Slight | Slight. |
| 23C<br>Mattaponi | Moderate:<br>slope,<br>percs slowly. | Moderate:<br>slope,<br>percs slowly. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 24B<br>Mecklenburg | Slight | Slight | Moderate:<br>slope,<br>small stones. | Slight | Slight. |

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails | Golf fairways |
|---|---|---|---|---|---|
| 24C, 24D<br>Mecklenburg | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 25C<br>Nason | Moderate:<br>slope,<br>small stones. | Moderate:<br>slope,<br>small stones. | Severe:<br>slope,<br>small stones. | Slight | Moderate:<br>small stones,<br>slope,<br>large stones. |
| 25D<br>Nason | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. | Moderate:<br>slope. | Severe:<br>slope. |
| 25E<br>Nason | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. | Severe:<br>slope. | Severe:<br>slope. |
| 26C<br>Poindexter | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 26D<br>Poindexter | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 26E<br>Poindexter | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 27C<br>Sequoia | Moderate:<br>percs slowly. | Moderate:<br>percs slowly. | Moderate:<br>slope,<br>depth to rock. | Slight | Moderate:<br>droughty. |
| 27D<br>Sequoia | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>droughty,<br>slope. |
| 28B<br>State | Severe:<br>flooding. | Slight | Moderate:<br>slope. | Slight | Slight. |
| 29D<br>Sweetapple | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>thin layer,<br>slope. |
| 29E<br>Sweetapple | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 30B<br>Tatum | Moderate:<br>small stones. | Moderate:<br>small stones. | Severe:<br>small stones. | Slight | Moderate:<br>small stones. |
| 30C<br>Tatum | Moderate:<br>slope,<br>small stones. | Moderate:<br>slope,<br>small stones. | Severe:<br>slope,<br>small stones. | Slight | Moderate:<br>small stones,<br>slope. |
| 30D<br>Tatum | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. | Moderate:<br>slope. | Severe:<br>slope. |
| 31B<br>Thurmont | Slight | Slight | Moderate:<br>slope,<br>small stones. | Slight | Slight. |
| 31C<br>Thurmont | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight | Moderate:<br>slope. |
| 31D<br>Thurmont | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

| Soil name and map symbol | Camp areas | Picnic areas | Playgrounds | Paths and trails | Golf fairways |
|---|---|---|---|---|---|
| 32A-------------------<br>Toccoa | Severe:<br>flooding. | Moderate:<br>flooding. | Severe:<br>flooding. | Moderate:<br>flooding. | Severe:<br>flooding. |
| 33B-------------------<br>Turbeville | Slight---------- | Slight---------- | Moderate:<br>slope,<br>small stones. | Slight---------- | Slight. |
| 33C-------------------<br>Turbeville | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight---------- | Moderate:<br>slope. |
| 33D-------------------<br>Turbeville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. |
| 34B, 34C--------------<br>Vance | Moderate:<br>percs slowly. | Moderate:<br>percs slowly. | Moderate:<br>slope,<br>small stones. | Slight---------- | Slight. |
| 35D-------------------<br>Wateree | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Slight---------- | Moderate:<br>slope,<br>droughty. |
| 35E-------------------<br>Wateree | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |

## TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

| Soil name and map symbol | Potential for habitat elements | | | | | | | Potential as habitat for-- | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grain and seed crops | Grasses and legumes | Wild herba-ceous plants | Hardwood trees | Conif-erous plants | Wetland plants | Shallow water areas | Openland wildlife | Woodland wildlife | Wetland wildlife |
| 1B Altavista | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 2D Ashe | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 2E Ashe | Very poor. | Poor | Good | Good | Good | Very poor. | Very poor. | Poor | Good | Very poor. |
| 3C Berks | Poor | Fair | Fair | Poor | Poor | Very poor. | Very poor. | Fair | Poor | Very poor. |
| 3D Berks | Very poor. | Fair | Fair | Poor | Poor | Very poor. | Very poor. | Poor | Poor | Very poor. |
| 3E Berks | Very poor. | Poor | Fair | Poor | Poor | Very poor. | Very poor. | Poor | Poor | Very poor. |
| 4B Braddock | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 4C Braddock | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 4D Braddock | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 5B Braddock | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 5C Braddock | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 6C, 6D Braddock | Very poor. | Poor | Good | Good | Good | Very poor. | Very poor. | Poor | Good | Very poor. |
| 7B Cecil | Good | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 7C Cecil | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 8A Chewacla | Good | Fair | Fair | Good | Good | Poor | Very poor. | Fair | Good | Very poor. |
| 9B Cullen | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 9C Cullen | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 9D Cullen | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 10D Dekalb | Very poor. | Poor | Good | Fair | Fair | Very poor. | Very poor. | Poor | Fair | Very poor. |

TABLE 9.--WILDLIFE HABITAT--Continued

| Soil name and map symbol | Potential for habitat elements | | | | | | | Potential as habitat for-- | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grain and seed crops | Grasses and legumes | Wild herbaceous plants | Hardwood trees | Coniferous plants | Wetland plants | Shallow water areas | Openland wildlife | Woodland wildlife | Wetland wildlife |
| 10E----------------<br>Dekalb | Very poor. | Poor | Good | Fair | Fair | Very poor. | Very poor. | Poor | Fair | Very poor. |
| 11C, 11D-----------<br>Edneytown | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 11E----------------<br>Edneytown | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 12C----------------<br>Edneytown | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 12D----------------<br>Edneytown | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 12E----------------<br>Edneytown | Very poor. | Very poor. | Good | Good | Good | Very poor. | Very poor. | Poor | Good | Very poor. |
| 13D, 13E-----------<br>Edneyville | Very poor. | Very poor. | Fair | Fair | Fair | Very poor. | Very poor. | Poor | Fair | Very poor. |
| 14C----------------<br>Grover | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 14D----------------<br>Grover | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 14E----------------<br>Grover | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 15C----------------<br>Gunstock | Fair | Fair | Fair | Poor | Poor | Very poor. | Very poor. | Fair | Poor | Very poor. |
| 15D----------------<br>Gunstock | Poor | Poor | Fair | Poor | Poor | Very poor. | Very poor. | Poor | Poor | Very poor. |
| 15E----------------<br>Gunstock | Very poor. | Poor | Fair | Poor | Poor | Very poor. | Very poor. | Poor | Poor | Very poor. |
| 16B----------------<br>Hayesville | Good | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 16C, 16D-----------<br>Hayesville | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 16E----------------<br>Hayesville | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 17C, 17D, 17E------<br>Hayesville | Very poor. | Poor | Good | Good | Good | Very poor. | Very poor. | Poor | Good | Very poor. |
| 18B----------------<br>Helena | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 18C----------------<br>Helena | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 19B, 19C-----------<br>Iredell | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 20B----------------<br>Laidig | Good | Good | Good | Fair | Fair | Poor | Very poor. | Good | Fair | Very poor. |

TABLE 9.--WILDLIFE HABITAT--Continued

| Soil name and map symbol | Potential for habitat elements | | | | | | | Potential as habitat for-- | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grain and seed crops | Grasses and legumes | Wild herbaceous plants | Hardwood trees | Coniferous plants | Wetland plants | Shallow water areas | Openland wildlife | Woodland wildlife | Wetland wildlife |
| 20C----------------<br>Laidig | Fair | Good | Good | Fair | Fair | Very poor. | Very poor. | Good | Fair | Very poor. |
| 21D3---------------<br>Madison | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 21E3---------------<br>Madison | Very poor. | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Fair | Very poor. |
| 22D, 22E-----------<br>Manteo | Very poor. | Poor | Poor | Very poor. | Fair | Very poor. | Very poor. | Poor | Very poor. | Very poor. |
| 23B----------------<br>Mattaponi | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 23C----------------<br>Mattaponi | Fair | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 24B----------------<br>Mecklenburg | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 24C, 24D-----------<br>Mecklenburg | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 25C----------------<br>Nason | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 25D----------------<br>Nason | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 25E----------------<br>Nason | Very poor. | Poor | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 26C----------------<br>Poindexter | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 26D----------------<br>Poindexter | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 26E----------------<br>Poindexter | Very poor. | Poor | Good | Good | Good | Very poor. | Very poor. | Poor | Good | Very poor. |
| 27C----------------<br>Sequoia | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 27D----------------<br>Sequoia | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 28B----------------<br>State | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 29D----------------<br>Sweetapple | Fair | Good | Fair | Fair | Fair | Very poor. | Very poor. | Fair | Fair | Very poor. |
| 29E----------------<br>Sweetapple | Very poor. | Poor | Fair | Poor | Poor | Very poor. | Very poor. | Poor | Poor | Very poor. |
| 30B----------------<br>Tatum | Fair | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 30C----------------<br>Tatum | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |

TABLE 9.--WILDLIFE HABITAT--Continued

| Soil name and map symbol | Potential for habitat elements | | | | | | | Potential as habitat for-- | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grain and seed crops | Grasses and legumes | Wild herbaceous plants | Hardwood trees | Coniferous plants | Wetland plants | Shallow water areas | Openland wildlife | Woodland wildlife | Wetland wildlife |
| 30D<br>Tatum | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 31B<br>Thurmont | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 31C<br>Thurmont | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 31D<br>Thurmont | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 32A<br>Toccoa | Poor | Fair | Fair | Good | Good | Poor | Very poor. | Fair | Good | Very poor. |
| 33B<br>Turbeville | Good | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 33C<br>Turbeville | Fair | Good | Good | Good | Good | Very poor. | Very poor. | Good | Good | Very poor. |
| 33D<br>Turbeville | Poor | Fair | Good | Good | Good | Very poor. | Very poor. | Fair | Good | Very poor. |
| 34B, 34C<br>Vance | Fair | Good | Good | Good | Good | Poor | Very poor. | Good | Good | Very poor. |
| 35D<br>Wateree | Poor | Poor | Poor | Fair | Fair | Very poor. | Very poor. | Poor | Fair | Very poor. |
| 35E<br>Wateree | Very poor. | Poor | Poor | Fair | Fair | Very poor. | Very poor. | Poor | Fair | Very poor. |

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets | Lawns and landscaping |
|---|---|---|---|---|---|---|
| 1B<br>Altavista | Severe:<br>wetness,<br>cutbanks cave. | Severe:<br>flooding. | Severe:<br>flooding,<br>wetness. | Severe:<br>flooding. | Moderate:<br>wetness,<br>flooding. | Moderate:<br>wetness. |
| 2D, 2E<br>Ashe | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 3C<br>Berks | Moderate:<br>slope,<br>depth to rock. | Moderate:<br>slope. | Moderate:<br>slope,<br>depth to rock. | Severe:<br>slope. | Moderate:<br>slope. | Severe:<br>small stones. |
| 3D, 3E<br>Berks | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. |
| 4B<br>Braddock | Moderate:<br>too clayey. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>low strength. | Slight. |
| 4C<br>Braddock | Moderate:<br>too clayey,<br>slope. | Moderate:<br>shrink-swell,<br>slope. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>slope. |
| 4D<br>Braddock | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength,<br>slope. | Severe:<br>slope. |
| 5B<br>Braddock | Moderate:<br>too clayey,<br>large stones. | Moderate:<br>shrink-swell,<br>large stones. | Moderate:<br>shrink-swell,<br>large stones. | Moderate:<br>shrink-swell,<br>slope,<br>large stones. | Severe:<br>low strength. | Severe:<br>large stones. |
| 5C<br>Braddock | Moderate:<br>too clayey,<br>large stones,<br>slope. | Moderate:<br>shrink-swell,<br>slope,<br>large stones. | Moderate:<br>shrink-swell,<br>slope,<br>large stones. | Severe:<br>slope. | Severe:<br>low strength. | Severe:<br>large stones. |
| 6C<br>Braddock | Moderate:<br>too clayey,<br>large stones,<br>slope. | Moderate:<br>shrink-swell,<br>slope,<br>large stones. | Moderate:<br>slope,<br>shrink-swell,<br>large stones. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>slope,<br>large stones. |
| 6D<br>Braddock | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength,<br>slope. | Severe:<br>slope. |
| 7B<br>Cecil | Moderate:<br>too clayey. | Slight | Slight | Moderate:<br>slope. | Moderate:<br>low strength. | Slight. |
| 7C<br>Cecil | Moderate:<br>too clayey,<br>slope. | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Moderate:<br>slope,<br>low strength. | Slight. |
| 8A<br>Chewacla | Severe:<br>wetness. | Severe:<br>flooding,<br>wetness. | Severe:<br>flooding,<br>wetness. | Severe:<br>flooding,<br>wetness. | Severe:<br>low strength,<br>wetness,<br>flooding. | Severe:<br>wetness. |

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets | Lawns and landscaping |
|---|---|---|---|---|---|---|
| 9B----------------<br>Cullen | Moderate:<br>too clayey. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>low strength. | Slight. |
| 9C----------------<br>Cullen | Moderate:<br>too clayey,<br>slope. | Moderate:<br>slope,<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>slope. |
| 9D----------------<br>Cullen | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength,<br>slope. | Severe:<br>slope. |
| 10D, 10E----------<br>Dekalb | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope. | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>small stones. |
| 11C---------------<br>Edneytown | Severe:<br>cutbanks cave. | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Moderate:<br>slope. |
| 11D, 11E----------<br>Edneytown | Severe:<br>cutbanks cave,<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 12C---------------<br>Edneytown | Severe:<br>cutbanks cave. | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Moderate:<br>large stones,<br>slope. |
| 12D, 12E----------<br>Edneytown | Severe:<br>cutbanks cave,<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>large stones. |
| 13D, 13E----------<br>Edneyville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>large stones. |
| 14C---------------<br>Grover | Moderate:<br>slope. | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Moderate:<br>low strength,<br>slope. | Moderate:<br>slope. |
| 14D, 14E----------<br>Grover | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 15C---------------<br>Gunstock | Moderate:<br>depth to rock,<br>large stones,<br>slope. | Moderate:<br>shrink-swell,<br>slope,<br>large stones. | Moderate:<br>depth to rock,<br>slope,<br>shrink-swell. | Severe:<br>slope. | Moderate:<br>shrink-swell,<br>low strength,<br>slope. | Severe:<br>large stones. |
| 15D, 15E----------<br>Gunstock | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>large stones,<br>slope. |
| 16B---------------<br>Hayesville | Moderate:<br>too clayey. | Slight--------- | Slight--------- | Moderate:<br>slope. | Moderate:<br>low strength. | Slight. |
| 16C---------------<br>Hayesville | Moderate:<br>too clayey,<br>slope. | Moderate:<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Moderate:<br>slope,<br>low strength. | Moderate:<br>slope. |
| 16D, 16E----------<br>Hayesville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets | Lawns and landscaping |
|---|---|---|---|---|---|---|
| 17C<br>Hayesville | Moderate:<br>too clayey,<br>slope. | Moderate:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>large stones,<br>slope. |
| 17D, 17E<br>Hayesville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength,<br>slope. | Severe:<br>slope. |
| 18B<br>Helena | Severe:<br>wetness. | Severe:<br>shrink-swell. | Severe:<br>wetness,<br>shrink-swell. | Severe:<br>shrink-swell. | Severe:<br>low strength,<br>shrink-swell. | Moderate:<br>wetness. |
| 18C<br>Helena | Severe:<br>wetness. | Severe:<br>shrink-swell. | Severe:<br>wetness,<br>shrink-swell. | Severe:<br>shrink-swell,<br>slope. | Severe:<br>low strength,<br>shrink-swell. | Moderate:<br>wetness,<br>slope. |
| 19B<br>Iredell | Severe:<br>wetness. | Severe:<br>wetness,<br>shrink-swell. | Severe:<br>wetness,<br>shrink-swell. | Severe:<br>wetness,<br>shrink-swell. | Severe:<br>low strength,<br>shrink-swell. | Moderate:<br>wetness. |
| 19C<br>Iredell | Severe:<br>wetness. | Severe:<br>wetness,<br>shrink-swell. | Severe:<br>wetness,<br>shrink-swell. | Severe:<br>wetness,<br>shrink-swell,<br>slope. | Severe:<br>low strength,<br>shrink-swell. | Moderate:<br>wetness,<br>slope. |
| 20B<br>Laidig | Moderate:<br>wetness. | Slight | Moderate:<br>wetness. | Moderate:<br>slope. | Moderate:<br>frost action,<br>low strength. | Moderate:<br>small stones. |
| 20C<br>Laidig | Moderate:<br>wetness,<br>slope. | Moderate:<br>slope. | Moderate:<br>slope,<br>wetness. | Severe:<br>slope. | Moderate:<br>slope,<br>frost action,<br>low strength. | Moderate:<br>small stones,<br>slope. |
| 21D3, 21E3<br>Madison | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength,<br>slope. | Severe:<br>slope. |
| 22D, 22E<br>Manteo | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope,<br>thin layer. |
| 23B<br>Mattaponi | Moderate:<br>too clayey,<br>wetness. | Moderate:<br>shrink-swell. | Moderate:<br>wetness,<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>low strength. | Slight. |
| 23C<br>Mattaponi | Moderate:<br>too clayey,<br>wetness,<br>slope. | Moderate:<br>shrink-swell,<br>slope. | Moderate:<br>wetness,<br>slope,<br>shrink-swell. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>slope. |
| 24B<br>Mecklenburg | Moderate:<br>too clayey. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>low strength. | Slight. |
| 24C<br>Mecklenburg | Moderate:<br>too clayey,<br>slope. | Moderate:<br>shrink-swell,<br>slope. | Moderate:<br>slope,<br>shrink-swell. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>slope. |
| 24D<br>Mecklenburg | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength,<br>slope. | Severe:<br>slope. |

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets | Lawns and landscaping |
|---|---|---|---|---|---|---|
| 25C<br>Nason | Moderate:<br>slope,<br>too clayey. | Moderate:<br>slope,<br>shrink-swell. | Moderate:<br>slope,<br>shrink-swell. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>small stones,<br>slope,<br>large stones. |
| 25D, 25E<br>Nason | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>low strength. | Severe:<br>slope. |
| 26C<br>Poindexter | Moderate:<br>depth to rock,<br>slope. | Moderate:<br>slope. | Moderate:<br>depth to rock,<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Moderate:<br>slope. |
| 26D, 26E<br>Poindexter | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 27C<br>Sequoia | Moderate:<br>depth to rock,<br>too clayey,<br>slope. | Moderate:<br>shrink-swell,<br>slope. | Moderate:<br>depth to rock,<br>slope,<br>shrink-swell. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>droughty,<br>slope. |
| 27D<br>Sequoia | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>low strength,<br>slope. | Severe:<br>slope. |
| 28B<br>State | Severe:<br>cutbanks cave. | Severe:<br>flooding. | Severe:<br>flooding. | Severe:<br>flooding. | Moderate:<br>low strength,<br>flooding. | Slight. |
| 29D, 29E<br>Sweetapple | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 30B<br>Tatum | Moderate:<br>too clayey. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>low strength. | Moderate:<br>small stones. |
| 30C<br>Tatum | Moderate:<br>slope,<br>too clayey. | Moderate:<br>shrink-swell,<br>slope. | Moderate:<br>slope,<br>shrink-swell. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>small stones,<br>slope. |
| 30D<br>Tatum | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>low strength. | Severe:<br>slope. |
| 31B<br>Thurmont | Moderate:<br>wetness. | Slight | Moderate:<br>wetness. | Moderate:<br>slope. | Moderate:<br>frost action. | Slight. |
| 31C<br>Thurmont | Moderate:<br>wetness,<br>slope. | Moderate:<br>slope. | Moderate:<br>wetness,<br>slope. | Severe:<br>slope. | Moderate:<br>slope,<br>frost action. | Moderate:<br>slope. |
| 31D<br>Thurmont | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |
| 32A<br>Toccoa | Moderate:<br>wetness,<br>flooding. | Severe:<br>flooding. | Severe:<br>flooding. | Severe:<br>flooding. | Severe:<br>flooding. | Severe:<br>flooding. |

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

| Soil name and map symbol | Shallow excavations | Dwellings without basements | Dwellings with basements | Small commercial buildings | Local roads and streets | Lawns landsca |
|---|---|---|---|---|---|---|
| 33B----------------<br>Turbeville | Moderate:<br>too clayey. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>low strength. | Slight. |
| 33C----------------<br>Turbeville | Moderate:<br>too clayey,<br>slope. | Moderate:<br>shrink-swell,<br>slope. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>slope. | Severe:<br>low strength. | Moderate:<br>slope. |
| 33D----------------<br>Turbeville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>low strength. | Severe:<br>slope. |
| 34B, 34C-----------<br>Vance | Moderate:<br>too clayey. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell. | Moderate:<br>shrink-swell,<br>slope. | Severe:<br>low strength. | Slight. |
| 35D, 35E-----------<br>Wateree | Severe:<br>cutbanks cave,<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. |

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| 1B-----------------<br>Altavista | Severe:<br>wetness. | Severe:<br>flooding,<br>wetness. | Severe:<br>wetness. | Severe:<br>seepage,<br>wetness. | Fair:<br>wetness. |
| 2D, 2E-------------<br>Ashe | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>slope. | Poor:<br>slope. |
| [illegible]-----------<br>Berks | Severe:<br>depth to rock,<br>slope. | Severe:<br>slope,<br>seepage,<br>depth to rock. | Severe:<br>slope,<br>depth to rock,<br>seepage. | Severe:<br>seepage,<br>slope,<br>depth to rock. | Poor:<br>small stones,<br>slope,<br>area reclaim. |
| 8B-----------------<br>Braddock | Moderate:<br>percs slowly. | Severe:<br>seepage. | Severe:<br>seepage,<br>too clayey. | Slight----------- | Poor:<br>too clayey,<br>hard to pack. |
| 8C-----------------<br>Braddock | Moderate:<br>percs slowly,<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage,<br>too clayey. | Moderate:<br>slope. | Poor:<br>too clayey,<br>hard to pack. |
| [illegible]-----------------<br>Braddock | Severe:<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage,<br>slope,<br>too clayey. | Severe:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>slope. |
| [illegible]-----------------<br>Braddock | Moderate:<br>percs slowly,<br>large stones. | Severe:<br>seepage,<br>large stones. | Severe:<br>seepage,<br>too clayey. | Slight----------- | Poor:<br>too clayey,<br>hard to pack,<br>large stones. |
| [illegible]-----------------<br>Braddock | Moderate:<br>percs slowly,<br>slope,<br>large stones. | Severe:<br>seepage,<br>slope,<br>large stones. | Severe:<br>seepage,<br>too clayey. | Moderate:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>large stones. |
| [illegible]-----------------<br>Braddock | Moderate:<br>percs slowly,<br>slope,<br>large stones. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage,<br>too clayey. | Moderate:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>small stones. |
| [illegible]-----------------<br>Braddock | Severe:<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage,<br>slope,<br>too clayey. | Severe:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>small stones. |
| [illegible]-----------------<br>Cecil | Moderate:<br>percs slowly. | Moderate:<br>seepage,<br>slope. | Moderate:<br>too clayey. | Slight----------- | Fair:<br>too clayey,<br>hard to pack. |
| [illegible]-----------------<br>Cecil | Moderate:<br>percs slowly,<br>slope. | Severe:<br>slope. | Moderate:<br>slope,<br>too clayey. | Moderate:<br>slope. | Fair:<br>too clayey,<br>hard to pack,<br>slope. |

TABLE 11.--SANITARY FACILITIES--Continued

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| 8A-----------------<br>Chewacla | Severe:<br>flooding,<br>wetness. | Severe:<br>flooding,<br>wetness. | Severe:<br>flooding,<br>wetness. | Severe:<br>flooding,<br>wetness. | Poor:<br>hard to pack,<br>wetness. |
| 9B-----------------<br>Cullen | Moderate:<br>percs slowly. | Moderate:<br>slope,<br>seepage. | Severe:<br>too clayey. | Slight----------- | Poor:<br>too clayey,<br>hard to pack. |
| 9C-----------------<br>Cullen | Moderate:<br>percs slowly,<br>slope. | Severe:<br>slope. | Severe:<br>too clayey. | Moderate:<br>slope. | Poor:<br>too clayey,<br>hard to pack. |
| 9D-----------------<br>Cullen | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>too clayey. | Severe:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>slope. |
| 10D, 10E-----------<br>Dekalb | Severe:<br>slope,<br>depth to rock,<br>poor filter. | Severe:<br>slope,<br>depth to rock,<br>seepage. | Severe:<br>slope,<br>depth to rock,<br>seepage. | Severe:<br>slope,<br>seepage,<br>depth to rock. | Poor:<br>slope,<br>small stones,<br>area reclaim. |
| 11C----------------<br>Edneytown | Moderate:<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage. | Severe:<br>seepage. | Fair:<br>too sandy,<br>slope. |
| 11D, 11E-----------<br>Edneytown | Severe:<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage,<br>slope. | Poor:<br>slope. |
| 12C----------------<br>Edneytown | Moderate:<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>seepage. | Severe:<br>seepage. | Fair:<br>too sandy,<br>slope. |
| 12D, 12E-----------<br>Edneytown | Severe:<br>slope. | Severe:<br>seepage,<br>slope. | Severe:<br>slope. | Severe:<br>seepage,<br>slope. | Poor:<br>slope. |
| 13D, 13E-----------<br>Edneyville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>depth to rock. | Severe:<br>slope. | Poor:<br>slope. |
| 14C----------------<br>Grover | Moderate:<br>slope. | Severe:<br>slope. | Moderate:<br>slope. | Moderate:<br>slope. | Fair:<br>slope. |
| 14D, 14E-----------<br>Grover | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Poor:<br>slope. |
| 15C----------------<br>Gunstock | Severe:<br>depth to rock. | Severe:<br>depth to rock,<br>slope. | Severe:<br>depth to rock. | Severe:<br>depth to rock. | Poor:<br>depth to rock,<br>large stones. |
| 15D, 15E-----------<br>Gunstock | Severe:<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>slope. | Poor:<br>depth to rock,<br>large stones,<br>slope. |
| 16B----------------<br>Hayesville | Moderate:<br>percs slowly. | Moderate:<br>seepage,<br>slope. | Severe:<br>seepage,<br>too clayey. | Slight----------- | Poor:<br>too clayey,<br>hard to pack. |

TABLE 11.--SANITARY FACILITIES--Continued

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| 16C-----------------<br>Hayesville | Moderate:<br>percs slowly,<br>slope. | Severe:<br>slope. | Severe:<br>seepage,<br>too clayey. | Moderate:<br>slope. | Poor:<br>too clayey,<br>hard to pack. |
| 16D, 16E------------<br>Hayesville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>seepage,<br>slope,<br>too clayey. | Severe:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>slope. |
| 17C, 17D------------<br>Hayesville | Moderate:<br>percs slowly. | Severe:<br>slope. | Severe:<br>seepage,<br>too clayey. | Moderate:<br>slope. | Poor:<br>too clayey,<br>hard to pack. |
| 17E-----------------<br>Hayesville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>seepage,<br>slope,<br>too clayey. | Severe:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>slope. |
| 18B-----------------<br>Helena | Severe:<br>wetness,<br>percs slowly. | Severe:<br>wetness. | Severe:<br>depth to rock,<br>wetness,<br>too clayey. | Moderate:<br>wetness,<br>depth to rock. | Poor:<br>too clayey,<br>hard to pack. |
| 18C-----------------<br>Helena | Severe:<br>wetness,<br>percs slowly. | Severe:<br>slope,<br>wetness. | Severe:<br>depth to rock,<br>wetness,<br>too clayey. | Moderate:<br>wetness,<br>depth to rock. | Poor:<br>too clayey,<br>hard to pack. |
| 19B-----------------<br>Iredell | Severe:<br>wetness,<br>percs slowly. | Severe:<br>wetness. | Severe:<br>wetness,<br>too clayey. | Severe:<br>wetness. | Poor:<br>too clayey,<br>hard to pack,<br>wetness. |
| 19C-----------------<br>Iredell | Severe:<br>wetness,<br>percs slowly. | Severe:<br>slope,<br>wetness. | Severe:<br>wetness,<br>too clayey. | Severe:<br>wetness. | Poor:<br>too clayey,<br>hard to pack,<br>wetness. |
| 20B-----------------<br>Leidig | Severe:<br>percs slowly,<br>wetness. | Severe:<br>seepage,<br>wetness. | Moderate:<br>wetness. | Severe:<br>seepage. | Fair:<br>small stones,<br>wetness. |
| 20C-----------------<br>Leidig | Severe:<br>percs slowly,<br>wetness. | Severe:<br>seepage,<br>slope,<br>wetness. | Moderate:<br>slope,<br>wetness. | Severe:<br>seepage. | Fair:<br>slope,<br>small stones,<br>wetness. |
| 21D, 21E------------<br>Madison | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope. | Poor:<br>slope,<br>thin layer. |
| 22D, 22E------------<br>Manteo | Severe:<br>depth to rock,<br>slope. | Severe:<br>slope,<br>depth to rock,<br>seepage. | Severe:<br>slope,<br>depth to rock,<br>seepage. | Severe:<br>slope,<br>seepage,<br>depth to rock. | Poor:<br>slope,<br>depth to rock,<br>small stones. |
| 23B-----------------<br>Mattaponi | Severe:<br>wetness,<br>percs slowly. | Severe:<br>wetness. | Severe:<br>too clayey. | Slight------------ | Poor:<br>too clayey,<br>hard to pack. |

TABLE 11.--SANITARY FACILITIES--Continued

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| 23C----------------- Mattaponi | Severe: wetness, percs slowly. | Severe: slope, wetness. | Severe: too clayey. | Moderate: slope. | Poor: too clayey, hard to pack. |
| 24B----------------- Mecklenburg | Severe: percs slowly. | Moderate: slope. | Severe: depth to rock, too clayey. | Slight----------- | Poor: too clayey, hard to pack. |
| 24C----------------- Mecklenburg | Severe: percs slowly. | Severe: slope. | Severe: depth to rock, too clayey. | Moderate: slope. | Poor: too clayey, hard to pack. |
| 24D----------------- Mecklenburg | Severe: percs slowly, slope. | Severe: slope. | Severe: depth to rock, too clayey, slope. | Severe: slope. | Poor: too clayey, hard to pack, slope. |
| 25C----------------- Nason | Moderate: slope, percs slowly, depth to rock. | Severe: slope. | Severe: too clayey, depth to rock. | Moderate: slope, depth to rock. | Poor: too clayey, hard to pack. |
| 25D, 25E------------ Nason | Severe: slope. | Severe: slope. | Severe: depth to rock, slope, too clayey. | Severe: slope. | Poor: slope, too clayey, hard to pack. |
| 26C----------------- Poindexter | Moderate: depth to rock, slope. | Severe: seepage, slope. | Severe: depth to rock, seepage. | Severe: seepage. | Fair: too clayey, depth to rock, slope. |
| 26D, 26E------------ Poindexter | Severe: slope. | Severe: seepage, slope. | Severe: depth to rock, seepage, slope. | Severe: seepage, slope. | Poor: slope. |
| 27C----------------- Sequoia | Severe: depth to rock, percs slowly. | Severe: depth to rock. | Severe: depth to rock, too clayey. | Severe: depth to rock. | Poor: area reclaim, too clayey, hard to pack. |
| 27D----------------- Sequoia | Severe: depth to rock, percs slowly, slope. | Severe: depth to rock, slope. | Severe: depth to rock, too clayey, slope. | Severe: depth to rock, slope. | Poor: area reclaim, too clayey, hard to pack. |
| 28B----------------- State | Moderate: flooding, wetness. | Severe: seepage, flooding. | Severe: seepage, wetness. | Moderate: flooding, wetness. | Fair: too clayey, thin layer. |
| 29D, 29E------------ Sweetapple | Severe: slope, depth to rock. | Severe: seepage, depth to rock, slope. | Severe: depth to rock, seepage, slope. | Severe: seepage, slope, depth to rock. | Poor: area reclaim, slope. |
| 30B----------------- Tatum | Moderate: depth to rock, percs slowly. | Moderate: seepage, depth to rock, slope. | Severe: too clayey, depth to rock. | Moderate: depth to rock. | Poor: too clayey, hard to pack, small stones. |

TABLE 11.--SANITARY FACILITIES--Continued

| Soil name and map symbol | Septic tank absorption fields | Sewage lagoon areas | Trench sanitary landfill | Area sanitary landfill | Daily cover for landfill |
|---|---|---|---|---|---|
| 30C-----------------<br>Tatum | Moderate:<br>depth to rock,<br>percs slowly,<br>slope. | Severe:<br>slope. | Severe:<br>too clayey,<br>depth to rock. | Moderate:<br>slope,<br>depth to rock. | Poor:<br>too clayey,<br>hard to pack,<br>small stones. |
| 30D-----------------<br>Tatum | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>too clayey,<br>depth to rock. | Severe:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>small stones. |
| 31B-----------------<br>Thurmont | Moderate:<br>wetness,<br>percs slowly. | Moderate:<br>seepage,<br>slope,<br>wetness. | Severe:<br>wetness. | Moderate:<br>wetness. | Fair:<br>small stones. |
| 31C-----------------<br>Thurmont | Moderate:<br>wetness,<br>percs slowly,<br>slope. | Severe:<br>slope. | Severe:<br>wetness. | Moderate:<br>slope,<br>wetness. | Fair:<br>small stones,<br>slope. |
| 31D-----------------<br>Thurmont | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>wetness,<br>slope. | Severe:<br>slope. | Poor:<br>slope. |
| 32A-----------------<br>Toccoa | Severe:<br>flooding,<br>wetness. | Severe:<br>seepage,<br>flooding,<br>wetness. | Severe:<br>flooding,<br>seepage,<br>wetness. | Severe:<br>flooding,<br>seepage,<br>wetness. | Good. |
| 33B-----------------<br>Turbeville | Moderate:<br>percs slowly. | Moderate:<br>slope. | Severe:<br>too clayey. | Slight----------- | Poor:<br>too clayey,<br>hard to pack. |
| 33C-----------------<br>Turbeville | Moderate:<br>slope,<br>percs slowly. | Severe:<br>slope. | Severe:<br>too clayey. | Moderate:<br>slope. | Poor:<br>too clayey,<br>hard to pack. |
| 33D-----------------<br>Turbeville | Severe:<br>slope. | Severe:<br>slope. | Severe:<br>slope,<br>too clayey. | Severe:<br>slope. | Poor:<br>too clayey,<br>hard to pack,<br>slope. |
| 34B, 34C------------<br>Vance | Severe:<br>percs slowly. | Moderate:<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>too clayey. | Moderate:<br>depth to rock. | Poor:<br>too clayey,<br>hard to pack. |
| 35D, 35E------------<br>Wateree | Severe:<br>slope,<br>depth to rock. | Severe:<br>seepage,<br>slope. | Severe:<br>depth to rock,<br>seepage,<br>slope. | Severe:<br>seepage,<br>slope. | Poor:<br>thin layer,<br>slope. |

## TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

| Soil name and map symbol | Roadfill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| 1B--------------------<br>Altavista | Fair:<br>wetness,<br>thin layer. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Good. |
| 2D--------------------<br>Ashe | Poor:<br>depth to rock,<br>thin layer. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 2E--------------------<br>Ashe | Poor:<br>thin layer, slope,<br>depth to rock. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 3C--------------------<br>Berks | Poor:<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>slope. |
| 3D--------------------<br>Berks | Poor:<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>slope. |
| 3E--------------------<br>Berks | Poor:<br>slope,<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>slope. |
| 4B, 4C----------------<br>Braddock | Fair:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>area reclaim,<br>small stones. |
| 4D--------------------<br>Braddock | Fair:<br>low strength,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>area reclaim,<br>small stones,<br>slope. |
| 5B, 5C----------------<br>Braddock | Fair:<br>low strength,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>large stones,<br>area reclaim,<br>slope. |
| 6C--------------------<br>Braddock | Fair:<br>low strength,<br>large stones. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>depth to rock,<br>small stones. |
| 6D--------------------<br>Braddock | Fair:<br>low strength,<br>large stones,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>depth to rock,<br>small stones,<br>slope. |
| 7B, 7C----------------<br>Cecil | Fair:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 8A--------------------<br>Chewacla | Poor:<br>low strength,<br>wetness. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>wetness. |
| 9B, 9C----------------<br>Cullen | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |

TABLE 12.--CONSTRUCTION MATERIALS--Continued

| Soil name and map symbol | Roadfill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| 9D-------------------- Cullen | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer,<br>slope. |
| 10D------------------- Dekalb | Poor:<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>small stones. |
| 10F------------------- Dekalb | Poor:<br>slope,<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>small stones. |
| 11C------------------- Edneytown | Good | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Fair:<br>small stones,<br>slope. |
| 11D------------------- Edneytown | Fair:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 11E------------------- Edneytown | Poor:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 12C------------------- Edneytown | Good | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Fair:<br>large stones,<br>small stones,<br>slope. |
| 12D------------------- Edneytown | Fair:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 12E------------------- Edneytown | Poor:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 13D------------------- Edneyville | Fair:<br>thin layer,<br>slope,<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>large stones. |
| 13E------------------- Edneyville | Poor:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>large stones. |
| 14C------------------- Grover | Fair:<br>low strength,<br>thin layer. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Fair:<br>slope,<br>too clayey. |
| 14D------------------- Grover | Fair:<br>low strength,<br>thin layer,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 14E------------------- Grover | Severe:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 15C------------------- [illegible] | Fair:<br>depth to rock,<br>shrink-swell. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>large stones,<br>area reclaim. |
| 15D------------------- [illegible] | Fair:<br>depth to rock,<br>shrink-swell,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>large stones,<br>area reclaim,<br>slope. |

TABLE 12.--CONSTRUCTION MATERIALS--Continued

| Soil name and map symbol | Roadfill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| 15E------------------<br>Gunstock | Poor:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>large stones,<br>area reclaim,<br>slope. |
| 16B------------------<br>Hayesville | Good---------------- | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 16C------------------<br>Hayesville | Fair:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 16D------------------<br>Hayesville | Fair:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer,<br>slope. |
| 16E------------------<br>Hayesville | Poor:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer,<br>slope. |
| 17C------------------<br>Hayesville | Good---------------- | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 17D------------------<br>Hayesville | Fair:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 17E------------------<br>Hayesville | Poor:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer,<br>slope. |
| 18B, 18C--------------<br>Helena | Poor:<br>low strength,<br>shrink-swell. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 19B, 19C--------------<br>Iredell | Poor:<br>low strength,<br>shrink-swell. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones. |
| 20B, 20C--------------<br>Laidig | Fair:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones. |
| 21D3------------------<br>Madison | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 21E3------------------<br>Madison | Poor:<br>low strength,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer,<br>slope. |
| 22E-------------------<br>Manteo | Poor:<br>depth to rock. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>area reclaim,<br>small stones. |
| 22F-------------------<br>Manteo | Poor:<br>slope,<br>depth to rock. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>area reclaim,<br>small stones. |
| 23B, 23C--------------<br>Mattaponi | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer. |
| 24B, 24C--------------<br>Mecklenburg | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>too clayey. |

TABLE 12.--CONSTRUCTION MATERIALS--Continued

| Soil name and map symbol | Roadfill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| 24D----------------------<br>Mecklenburg | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>too clayey,<br>slope. |
| 25C----------------------<br>Nason | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>area reclaim. |
| 25D----------------------<br>Nason | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>small stones,<br>area reclaim. |
| 25E----------------------<br>Nason | Poor:<br>low strength,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>small stones,<br>area reclaim. |
| 26C----------------------<br>Poindexter | Fair:<br>depth to rock,<br>thin layer. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Fair:<br>small stones,<br>slope. |
| 26D----------------------<br>Poindexter | Fair:<br>depth to rock,<br>thin layer,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 26E----------------------<br>Poindexter | Poor:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 27C----------------------<br>Sequoia | Poor:<br>area reclaim,<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones. |
| 27D----------------------<br>Sequoia | Poor:<br>area reclaim,<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>slope. |
| 28B----------------------<br>State | Good-------------------- | Probable---------------- | Improbable:<br>too sandy. | Good. |
| 29C----------------------<br>Sweetapple | Poor:<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>area reclaim,<br>slope. |
| [illegible]----------------------<br>Sweetapple | Poor:<br>slope,<br>area reclaim. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>area reclaim,<br>slope. |
| 30C, [illegible]----------------<br>Tatum | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>too clayey. |
| 30D----------------------<br>Tatum | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>small stones,<br>too clayey. |
| 31B----------------------<br>Thurmont | Good-------------------- | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Fair:<br>too clayey,<br>small stones. |

TABLE 12.--CONSTRUCTION MATERIALS--Continued

| Soil name and map symbol | Roadfill | Sand | Gravel | Topsoil |
|---|---|---|---|---|
| 31C<br>Thurmont | Good | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Fair:<br>too clayey,<br>small stones,<br>slope. |
| 31D<br>Thurmont | Fair:<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope. |
| 32A<br>Toccoa | Good | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Good. |
| 33B, 33C<br>Turbeville | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>too clayey. |
| 33D<br>Turbeville | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>too clayey,<br>slope. |
| 34B, 34C<br>Vance | Poor:<br>low strength. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Fair:<br>small stones. |
| 35D<br>Wateree | Poor:<br>thin layer. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>small stones,<br>slope. |
| 35E<br>Wateree | Poor:<br>thin layer,<br>slope. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>slope,<br>small stones. |

## TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

| Soil name and map symbol | Limitations for-- | | Features affecting-- | | | |
|---|---|---|---|---|---|---|
| | Pond reservoir areas | Embankments, dikes, and levees | Drainage | Irrigation | Terraces and diversions | Grassed waterways |
| 1B<br>Altavista | Moderate:<br>seepage. | Moderate:<br>wetness. | Slope | Wetness,<br>slope. | Wetness | Favorable. |
| 2D, 2E<br>Ashe | Severe:<br>slope. | Severe:<br>piping. | Deep to water | Slope | Slope | Slope. |
| 3C, 3D, 3E<br>Berks | Severe:<br>seepage,<br>slope. | Severe:<br>seepage. | Deep to water | Slope,<br>droughty,<br>depth to rock. | Depth to rock,<br>slope,<br>large stones. | Droughty,<br>depth to rock,<br>slope. |
| 4B<br>Braddock | Moderate:<br>seepage,<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope | Large stones | Favorable. |
| 4C, 4D<br>Braddock | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope | Slope,<br>large stones. | Slope. |
| 5B<br>Braddock | Moderate:<br>seepage,<br>slope. | Severe:<br>hard to pack,<br>large stones. | Deep to water | Large stones,<br>slope. | Large stones | Large stones. |
| 5C<br>Braddock | Severe:<br>slope. | Severe:<br>hard to pack,<br>large stones. | Deep to water | Large stones,<br>slope. | Slope,<br>large stones. | Large stones,<br>slope. |
| 6C, 6D<br>Braddock | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Large stones,<br>slope. | Slope,<br>large stones. | Large stones,<br>slope. |
| 7B<br>Cecil | Moderate:<br>seepage. | Severe:<br>hard to pack. | Deep to water | Slope | Favorable | Favorable. |
| 7C<br>Cecil | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope | Slope | Slope. |
| 8A<br>Chewacla | Moderate:<br>seepage. | Severe:<br>piping,<br>hard to pack,<br>wetness. | Flooding | Wetness,<br>flooding. | Wetness | Wetness. |
| 9B<br>Cullen | Moderate:<br>seepage,<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope,<br>erodes easily. | Erodes easily | Erodes easily. |
| 9C, 9D<br>Cullen | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope,<br>erodes easily. | Slope,<br>erodes easily. | Slope,<br>erodes easily. |
| 10D, 10E<br>DeKalb | Severe:<br>seepage,<br>slope. | Severe:<br>piping,<br>large stones. | Deep to water | Slope,<br>droughty,<br>depth to rock. | Slope,<br>depth to rock,<br>large stones. | Slope,<br>large stones,<br>droughty. |
| 11C, 11D, 11E,<br>12C, 12D, 12E<br>Edneytown | Severe:<br>seepage,<br>slope. | Severe:<br>seepage,<br>piping. | Deep to water | Slope | Slope,<br>too sandy. | Slope. |

TABLE 13.--WATER MANAGEMENT--Continued

| Soil name and map symbol | Limitations for-- |  | Features affecting-- |  |  |  |
|---|---|---|---|---|---|---|
|  | Pond reservoir areas | Embankments, dikes, and levees | Drainage | Irrigation | Terraces and diversions | Grassed waterways |
| 13D, 13E----------<br>Edneyville | Severe:<br>slope. | Moderate:<br>piping. | Deep to water | Slope,<br>large stones. | Slope,<br>large stones. | Slope,<br>large stones. |
| 14C, 14D, 14E-----<br>Grover | Severe:<br>slope. | Moderate:<br>thin layer,<br>piping. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 15C, 15D, 15E-----<br>Gunstock | Severe:<br>slope. | Moderate:<br>thin layer,<br>large stones. | Deep to water | Slope:<br>large stones,<br>depth to rock. | Slope:<br>large stones,<br>depth to rock. | Large stones,<br>slope. |
| 16B---------------<br>Hayesville | Moderate:<br>seepage,<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope---------- | Favorable------ | Favorable. |
| 16C, 16D----------<br>Hayesville | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 17C, 17D, 17E-----<br>Hayesville | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 18B---------------<br>Helena | Moderate:<br>depth to rock,<br>slope. | Severe:<br>hard to pack. | Percs slowly,<br>slope. | Wetness,<br>percs slowly. | Wetness,<br>percs slowly. | Percs slowly. |
| 18C---------------<br>Helena | Severe:<br>slope. | Severe:<br>hard to pack. | Percs slowly,<br>slope. | Wetness,<br>percs slowly. | Slope,<br>wetness,<br>percs slowly. | Slope,<br>percs slowly. |
| 19B---------------<br>Iredell | Moderate:<br>slope. | Severe:<br>hard to pack. | Percs slowly,<br>slope. | Wetness,<br>soil blowing,<br>percs slowly. | Wetness,<br>soil blowing. | Wetness,<br>percs slowly. |
| [illegible]---------------<br>Iredell | Severe:<br>slope. | Severe:<br>hard to pack. | Percs slowly,<br>slope. | Wetness,<br>soil blowing,<br>percs slowly. | Slope,<br>wetness,<br>soil blowing. | Wetness,<br>slope,<br>percs slowly. |
| 20B---------------<br>Laidig | Severe:<br>seepage. | Severe:<br>piping. | Deep to water | Rooting depth,<br>slope. | Rooting depth | Rooting depth. |
| 20C---------------<br>Laidig | Severe:<br>seepage,<br>slope. | Severe:<br>piping. | Deep to water | Rooting depth,<br>slope. | Slope,<br>rooting depth. | Slope,<br>rooting depth. |
| 21D3, 21E3--------<br>Madison | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 22D, 22E----------<br>Manteo | Severe:<br>depth to rock,<br>slope. | Severe:<br>piping. | Deep to water | Large stones,<br>droughty,<br>depth to rock. | Large stones,<br>depth to rock,<br>slope. | Large stones,<br>slope,<br>droughty. |
| 23B---------------<br>Mattaponi | Moderate:<br>slope. | Moderate:<br>thin layer,<br>hard to pack. | Deep to water | Slope---------- | Favorable------ | Favorable. |
| 23C---------------<br>Mattaponi | Severe:<br>slope. | Moderate:<br>thin layer,<br>hard to pack. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 24B---------------<br>Mecklenburg | Moderate:<br>depth to rock. | Severe:<br>hard to pack. | Deep to water | Percs slowly,<br>slope. | Percs slowly--- | Percs slowly. |

TABLE 13.--WATER MANAGEMENT--Continued

| Soil name and map symbol | Limitations for-- | | Features affecting-- | | | |
|---|---|---|---|---|---|---|
| | Pond reservoir areas | Embankments, dikes, and levees | Drainage | Irrigation | Terraces and diversions | Grassed waterways |
| 24C, 24D----------<br>Mecklenburg | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Percs slowly,<br>slope. | Slope,<br>percs slowly. | Slope,<br>percs slowly. |
| 25C, 25D, 25E-----<br>Nason | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 26C, 26D, 26E-----<br>Poindexter | Severe:<br>seepage,<br>slope. | Severe:<br>piping. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 27C---------------<br>Sequoia | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Droughty,<br>depth to rock. | Depth to rock,<br>erodes easily. | Erodes easily,<br>droughty. |
| 27D---------------<br>Sequoia | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Droughty,<br>depth to rock. | Slope,<br>depth to rock,<br>erodes easily. | Slope,<br>erodes easily,<br>droughty. |
| 28B---------------<br>State | Moderate:<br>seepage,<br>slope. | Moderate:<br>thin layer,<br>piping. | Deep to water | Soil blowing,<br>slope. | Soil blowing--- | Favorable. |
| 29D, 29E----------<br>Sweetapple | Severe:<br>seepage,<br>slope. | Severe:<br>piping. | Deep to water | Slope,<br>soil blowing,<br>depth to rock. | Depth to rock,<br>too sandy,<br>slope. | Depth to rock,<br>slope. |
| 30B---------------<br>Tatum | Moderate:<br>seepage,<br>depth to rock,<br>slope. | Severe:<br>piping,<br>hard to pack. | Deep to water | Slope---------- | Favorable------ | Favorable. |
| 30C, 30D----------<br>Tatum | Severe:<br>slope. | Severe:<br>piping,<br>hard to pack. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 31B---------------<br>Thurmont | Moderate:<br>seepage,<br>slope. | Moderate:<br>thin layer,<br>piping. | Deep to water | Slope---------- | Favorable------ | Favorable. |
| 31C, 31D----------<br>Thurmont | Severe:<br>slope. | Moderate:<br>thin layer,<br>piping. | Deep to water | Slope---------- | Slope---------- | Slope. |
| 32A---------------<br>Toccoa | Severe:<br>seepage. | Severe:<br>piping. | Flooding------- | Flooding------- | Favorable------ | Favorable. |
| 33B---------------<br>Turbeville | Moderate:<br>seepage,<br>slope. | Moderate:<br>hard to pack. | Deep to water | Soil blowing,<br>slope. | Soil blowing--- | Favorable. |
| 33C, 33D----------<br>Turbeville | Severe:<br>slope. | Moderate:<br>hard to pack. | Deep to water | Soil blowing,<br>slope. | Slope,<br>soil blowing. | Slope. |
| 34B---------------<br>Vance | Moderate:<br>depth to rock,<br>slope. | Severe:<br>hard to pack. | Deep to water | Percs slowly,<br>slope. | Erodes easily,<br>percs slowly. | Erodes easily,<br>percs slowly. |
| 34C---------------<br>Vance | Severe:<br>slope. | Severe:<br>hard to pack. | Deep to water | Percs slowly,<br>slope. | Erodes easily,<br>percs slowly,<br>slope. | Erodes easily,<br>percs slowly,<br>slope. |
| 35D, 35E----------<br>Wateree | Severe:<br>seepage,<br>slope. | Severe:<br>piping. | Deep to water | Droughty,<br>soil blowing. | Slope,<br>soil blowing. | Slope,<br>droughty. |

## TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

| Soil name and map symbol | Depth | USDA texture | Classification | | Frag- ments > 3 inches | Percentage passing sieve number-- | | | | Liquid limit | Plas- ticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | | 4 | 10 | 40 | 200 | | |
| | In | | | | Pct | | | | | Pct | |
| 1B---------------- Altavista | 0-8 | Fine sandy loam | ML, CL-ML, SM, SM-SC | A-4, A-2 | 0 | 95-100 | 90-100 | 65-99 | 35-60 | <23 | NP-7 |
| | 8-72 | Clay loam, sandy clay loam, loam. | CL, CL-ML, SC, SM-SC | A-4, A-6, A-7 | 0 | 95-100 | 95-100 | 60-99 | 45-75 | 20-45 | 5-28 |
| 2D, 2E----------- Ashe | 0-5 | Gravelly sandy loam. | SM, SM-SC | A-4, A-2 | 15-35 | 80-90 | 75-90 | 60-90 | 30-49 | <25 | NP-7 |
| | 5-23 | Sandy clay loam, clay loam, silty clay loam. | CL, CL-ML | A-4, A-6 | 5-15 | 85-100 | 85-95 | 60-95 | 35-49 | 25-35 | 5-15 |
| | 23 | Unweathered bedrock. | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3C, 3D, 3E------- Berks | 0-11 | Channery loam---- | GM, ML, GC, SC | A-2, A-4 | 0-20 | 50-80 | 45-70 | 40-60 | 30-55 | 25-36 | 5-10 |
| | 11-21 | Channery loam, very channery loam, channery silt loam. | GM, GC, SM, SC | A-1, A-2, A-4 | 0-30 | 40-80 | 35-70 | 25-60 | 20-45 | 25-36 | 5-10 |
| | 21-36 | Channery loam, very channery loam, channery silt loam. | GM, SM | A-1, A-2 | 0-40 | 35-65 | 25-55 | 20-40 | 15-35 | 24-38 | 2-10 |
| | 36 | Weathered bedrock | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4B, 4C, 4D------- Braddock | 0-11 | Fine sandy loam | CL, SM, ML, SC | A-2, A-4 | 0-5 | 85-100 | 75-95 | 50-85 | 25-65 | <30 | NP-10 |
| | 11-48 | Clay loam, clay, sandy clay. | MH, CH, CL, SC | A-7, A-2 | 0-15 | 80-95 | 75-90 | 45-90 | 20-80 | 42-60 | 15-33 |
| | 48-72 | Clay loam, sandy clay loam. | CL, SC | A-6, A-7 | 0-20 | 75-95 | 60-90 | 55-80 | 30-70 | 25-50 | 8-28 |
| 5B, 5C----------- Braddock | 0-11 | Cobbly fine sandy loam. | SM, SC, CL, ML | A-2, A-4 | 25-50 | 75-100 | 70-95 | 50-85 | 25-65 | <30 | NP-10 |
| | 11-48 | Cobbly sandy clay, cobbly clay loam, cobbly clay. | SC, CL, CH, MH | A-2, A-7 | 25-50 | 75-95 | 70-90 | 60-85 | 30-80 | 42-60 | 15-33 |
| | 48-72 | Cobbly loam, very cobbly sandy clay loam. | SC, CL, GC | A-2, A-7 | 25-75 | 70-85 | 30-80 | 25-70 | 20-65 | 25-50 | 8-28 |
| 6C, 6D----------- Braddock | 0-11 | Fine sandy loam | CL, SM, SC, ML | A-2, A-4 | 5-15 | 85-100 | 75-95 | 50-85 | 25-65 | <30 | NP-10 |
| | 11-48 | Clay loam, gravelly sandy clay, cobbly clay. | MH, CH, CL, SC | A-7, A-2 | 0-30 | 60-95 | 50-90 | 40-90 | 30-80 | 42-60 | 15-30 |
| | 48-72 | Cobbly loam, very cobbly sandy clay loam. | SC, CL, GC | A-2, A-7 | 25-75 | 70-85 | 30-80 | 25-70 | 20-65 | 25-50 | 8-28 |
| 7B, 7C----------- Cecil | 0-6 | Fine sandy loam | SM, SM-SC | A-2, A-4 | 0-5 | 84-100 | 80-100 | 67-90 | 26-42 | <30 | NP-6 |
| | 6-9 | Sandy clay loam, clay loam. | SM, SC, ML, CL | A-4, A-6 | 0-5 | 74-100 | 72-100 | 68-95 | 38-81 | 21-35 | 3-15 |
| | 9-56 | Clay, clay loam | MH, ML, CL | A-7, A-5 | 0-5 | 97-100 | 92-100 | 72-99 | 55-95 | 41-80 | 9-37 |
| | 56-72 | Variable--------- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

| Soil name and map symbol | Depth | USDA texture | Classification | | Fragments > 3 inches | Percentage passing sieve number-- | | | | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | | 4 | 10 | 40 | 200 | | |
| | In | | | | Pct | | | | | Pct | |
| 8A---------------<br>Chewacla | 0-10 | Loam------------- | ML, CL, CL-ML | A-4, A-6, A-7 | 0 | 98-100 | 95-100 | 70-100 | 55-90 | 25-49 | 4-20 |
| | 10-24 | Silt loam, silty clay loam, clay loam. | ML, CL | A-4, A-6, A-7 | 0 | 96-100 | 95-100 | 80-100 | 51-98 | 30-49 | 4-22 |
| | 24-38 | Sandy clay loam, loam, sandy loam. | SM, SM-SC, ML | A-4, A-7-6 | 0 | 96-100 | 95-100 | 60-96 | 36-70 | 20-45 | NP-15 |
| | 38-72 | Variable--------- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9B, 9C, 9D-------<br>Cullen | 0-5 | Sandy loam------- | CL | A-6, A-4 | 0 | 90-100 | 85-100 | 75-95 | 50-75 | 25-40 | 7-20 |
| | 5-62 | Clay, clay loam | MH, ML | A-7 | 0 | 90-100 | 85-100 | 75-100 | 65-95 | 45-80 | 15-35 |
| | 62-72 | Clay loam, clay, loam. | CH, MH, CL, ML | A-7, A-6 | 0 | 90-100 | 85-100 | 75-100 | 50-85 | 30-60 | 5-30 |
| 10D, 10E---------<br>Dekalb | 0-5 | Sandy loam------- | SM, GM, ML, CL-ML | A-2, A-4, A-1 | 10-30 | 50-90 | 45-80 | 40-75 | 20-55 | 10-32 | NP-10 |
| | 5-20 | Channery sandy loam, channery loam, very channery sandy loam. | SM, GM, ML, GM-GC | A-2, A-4, A-1 | 5-40 | 50-85 | 40-75 | 40-75 | 20-55 | 15-32 | NP-9 |
| | 20-25 | Channery sandy loam, flaggy sandy loam, very flaggy loamy sand. | SM, GM, SC, GC | A-2, A-4, A-1 | 10-50 | 45-85 | 25-75 | 20-65 | 15-40 | 15-32 | NP-9 |
| | 25 | Unweathered bedrock. | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11C, 11D, 11E----<br>Edneytown | 0-5 | Loam------------- | SM, ML, CL-ML, SM-SC | A-4 | 0-2 | 95-100 | 90-100 | 70-85 | 40-70 | <25 | NP-7 |
| | 5-31 | Sandy clay loam, clay loam. | SC, CL, CL-ML, SM-SC | A-4, A-6 | 0 | 98-100 | 95-100 | 80-97 | 45-75 | 25-35 | 5-15 |
| | 31-40 | Sandy loam, sandy clay loam. | SM, SC, ML, CL | A-2, A-4 | 0 | 98-100 | 95-100 | 65-85 | 30-55 | <25 | NP-9 |
| | 40-72 | Loamy sand, sandy loam. | SM, SM-SC | A-2, A-4 | 0 | 98-100 | 95-100 | 50-70 | 15-40 | <25 | NP-7 |
| 12C, 12D, 12E----<br>Edneytown | 0-5 | Loam------------- | SM, ML, CL-ML, SM-SC | A-4 | 65-75 | 95-100 | 75-100 | 70-85 | 40-70 | <25 | NP-7 |
| | 5-31 | Sandy clay loam, clay loam. | SC, CL, CL-ML, SM-SC | A-4, A-6 | 0-5 | 98-100 | 95-100 | 80-97 | 45-75 | 25-35 | 5-15 |
| | 31-40 | Sandy loam, sandy clay loam. | SM, SC, ML, CL | A-2, A-4 | 0-5 | 98-100 | 95-100 | 65-85 | 30-55 | <25 | NP-9 |
| | 40-72 | Loamy sand, sandy loam. | SM, SM-SC | A-2, A-4 | 0-5 | 98-100 | 95-100 | 50-70 | 15-40 | <25 | NP-7 |
| 13D, 13E---------<br>Edneyville | 0-6 | Gravelly fine sandy loam. | SM, SM-SC | A-4 | 15-30 | 75-95 | 70-90 | 60-85 | 35-50 | <30 | NP-7 |
| | 6-61 | Gravelly fine sandy loam, gravelly loam, gravelly sandy loam. | SM, SM-SC | A-4 | 15-30 | 75-100 | 65-85 | 45-65 | 36-50 | <25 | NP-7 |

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

| Soil name and map symbol | Depth | USDA texture | Classification |  | Frag- ments > 3 inches | Percentage passing sieve number-- |  |  |  | Liquid limit | Plas- ticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Unified | AASHTO |  | 4 | 10 | 40 | 200 |  |  |
|  | In |  |  |  | Pct |  |  |  |  | Pct |  |
| 14C, 14D, 14E---- Grover | 0-9 | Fine sandy loam | SM, SM-SC, SC | A-4 | 0-5 | 95-100 | 90-100 | 50-75 | 25-49 | <30 | NP-10 |
|  | 9-36 | Sandy clay loam, clay loam. | SM, ML, MH | A-6, A-7 | 0-5 | 95-100 | 90-100 | 70-85 | 40-70 | 38-65 | 12-30 |
|  | 36-72 | Sandy loam, loam, sandy clay loam. | SM, SM-SC | A-4 | 0-5 | 90-100 | 85-100 | 65-95 | 25-49 | <30 | NP-7 |
| 15C, 15D, 15E---- Gunstock | 0-8 | Channery loam---- | ML, CL, SM, SC | A-2, A-4 | 15-25 | 55-75 | 50-75 | 40-70 | 25-65 | <30 | NP-10 |
|  | 8-23 | Clay loam, silty clay loam, channery clay loam. | CL, SC | A-6, A-7 | 15-50 | 85-95 | 75-90 | 60-85 | 40-80 | 30-45 | 15-25 |
|  | 23-34 | Channery clay loam, channery silty clay loam, very channery clay loam. | CL, SC | A-2, A-4, A-6 | 25-65 | 50-90 | 35-85 | 25-80 | 15-65 | 25-40 | 10-20 |
|  | 34 | Weathered bedrock. | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16B, 16C, 16D, 16E------------- Hayesville | 0-6 | Loam------------- | SM, SC, ML, CL | A-4 | 0 | 90-100 | 85-95 | 70-95 | 35-60 | <30 | NP-10 |
|  | 6-40 | Clay loam, clay | ML, MH, CL, CH | A-6, A-7 | 0 | 90-100 | 85-100 | 70-100 | 55-80 | 36-66 | 11-35 |
|  | 40-51 | Sandy clay loam, clay loam. | SM, ML, MH, CL | A-6, A-7 | 0-5 | 90-100 | 90-100 | 85-95 | 45-65 | 36-55 | 11-25 |
|  | 51-72 | Fine sandy loam, loam, sandy clay loam. | SM, ML, CL, SC | A-4, A-6 | 5-15 | 90-100 | 90-95 | 65-90 | 40-55 | <28 | NP-12 |
| 17C, 17D, 17E---- Hayesville | 0-6 | Very stony loam | SM, SC, ML, CL | A-4, A-6 | 5-25 | 90-100 | 85-100 | 60-95 | 36-75 | <35 | NP-15 |
|  | 6-40 | Clay loam, clay | ML, MH, CL, CH | A-6, A-7 | 0-5 | 90-100 | 85-100 | 75-100 | 60-95 | 35-70 | 11-30 |
|  | 40-51 | Sandy clay loam, clay loam. | SM, ML, MH, CL | A-2, A-6, A-7 | 0-5 | 90-100 | 85-100 | 70-100 | 30-80 | 30-55 | 11-25 |
|  | 51-72 | Fine sandy loam, loam. | SM, SC, ML, CL | A-4, A-6 | 5-15 | 90-100 | 85-95 | 60-80 | 36-50 | <28 | NP-12 |
| 18B, 18C--------- Helena | 0-9 | Fine sandy loam | SM, SM-SC, SC | A-2, A-4 | 0-5 | 95-100 | 90-100 | 51-90 | 26-46 | <30 | NP-9 |
|  | 9-13 | Sandy clay loam, clay loam, sandy loam. | CL, SC | A-6, A-7 | 0-5 | 95-100 | 95-100 | 70-90 | 49-70 | 30-49 | 15-26 |
|  | 13-59 | Clay loam, sandy clay, clay. | CH | A-7 | 0-5 | 95-100 | 95-100 | 73-97 | 56-86 | 50-85 | 24-50 |
|  | 59-72 | Variable--------- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19B, 19C--------- Iredell | 0-11 | Fine sandy loam | SM, SM-SC, SC | A-2-4, A-4 | 0-1 | 90-98 | 80-96 | 60-82 | 30-50 | <35 | NP-9 |
|  | 11-27 | Clay------------- | CH | A-7 | 0 | 99-100 | 60-100 | 60-100 | 55-95 | 54-115 | 29-85 |
|  | 27-37 | Loam, sandy clay loam, clay loam. | CL, CH, SC | A-7 | 0-1 | 98-100 | 85-100 | 70-95 | 40-75 | 41-60 | 20-39 |
|  | 37-72 | Variable--------- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

| Soil name and map symbol | Depth | USDA texture | Classification | | Fragments > 3 inches | Percentage passing sieve number-- | | | | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | | 4 | 10 | 40 | 200 | | |
| | In | | | | Pct | | | | | Pct | |
| 20B, 20C--------- Laidig | 0-7 | Gravelly fine sandy loam. | SM, GM, GM-GC, SM-SC | A-1, A-2, A-4 | 0-5 | 65-90 | 55-80 | 35-70 | 15-45 | 15-25 | NP-5 |
| | 7-36 | Channery loam, channery sandy clay loam, channery sandy loam. | SM, SC, CL, ML | A-2, A-4, A-6 | 5-20 | 70-95 | 55-90 | 40-80 | 20-70 | 15-40 | 2-18 |
| | 36-72 | Channery sandy clay loam, channery loam, channery sandy loam. | GC, SC, GM-GC, CL-ML | A-2, A-4, A-6 | 5-20 | 50-90 | 40-85 | 30-80 | 15-70 | 15-35 | 2-16 |
| 21D3, 21E3------- Madison | 0-7 | Sandy clay loam | CL, ML | A-4, A-6 | 0-3 | 90-100 | 85-100 | 70-95 | 50-80 | 20-40 | 7-20 |
| | 7-25 | Clay, clay loam, sandy clay. | MH, ML | A-7 | 0-3 | 90-100 | 85-100 | 75-97 | 57-85 | 43-75 | 12-35 |
| | 25-30 | Loam, sandy clay loam, clay loam. | CL | A-4, A-6 | 0-3 | 90-100 | 85-100 | 70-95 | 50-80 | 20-40 | 7-20 |
| | 30-72 | Variable--------- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22D, 22F--------- Manteo | 0-7 | Channery silt loam. | GM, ML, CL, GC | A-4 | 10-25 | 60-100 | 55-95 | 50-90 | 36-85 | 18-32 | 2-15 |
| | 7-17 | Very channery silt loam, channery silt loam, channery clay loam. | GM, GC, ML, CL | A-1, A-2, A-4, A-6 | 15-40 | 40-90 | 30-90 | 30-85 | 20-80 | 18-38 | 2-20 |
| | 17 | Unweathered bedrock. | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23B, 23C--------- Mattaponi | 0-10 | Sandy loam------- | SM, SC, ML, CL | A-2, A-4, A-6 | 0 | 80-100 | 75-100 | 50-100 | 20-85 | 15-35 | NP-15 |
| | 10-65 | Clay loam, sandy clay, clay. | CL, CH, SC | A-6, A-7 | 0 | 80-100 | 75-100 | 65-100 | 45-95 | 35-70 | 15-40 |
| 24B, 24C, 24D---- Mecklenburg | 0-5 | Loam------------- | ML, SM | A-4, A-6, A-7-6 | 0-5 | 90-100 | 80-100 | 65-90 | 36-65 | <45 | NP-15 |
| | 5-17 | Clay------------- | CH, MH | A-7 | 0-5 | 90-100 | 85-100 | 80-100 | 75-95 | 51-75 | 24-45 |
| | 17-40 | Loam, sandy clay loam, clay loam. | CL, ML | A-4, A-6, A-7 | 0-5 | 90-100 | 85-100 | 80-100 | 50-80 | 25-49 | 11-25 |
| | 40-72 | Weathered bedrock | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25C, 25D, 25E---- Nason | 0-5 | Gravelly silt loam. | SM, ML, GM | A-1, A-2, A-4 | 0-10 | 65-85 | 55-75 | 40-75 | 20-70 | <38 | NP-10 |
| | 5-33 | Silty clay loam, silty clay, clay. | CL, CH, MH, ML | A-7 | 0-5 | 80-100 | 75-100 | 70-95 | 65-90 | 40-60 | 15-30 |
| | 33-48 | Channery silt loam, silt loam, silty clay loam. | CL, CL-ML, SC, GC | A-2, A-4, A-6 | 0-5 | 60-80 | 50-75 | 40-75 | 30-70 | 20-35 | 4-12 |
| | 48 | Weathered bedrock | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26C, 26D, 26E---- Poindexter | 0-9 | Fine sandy loam | SM, SC, SM-SC | A-2, A-4 | 0 | 90-100 | 85-100 | 50-100 | 20-50 | <25 | NP-10 |
| | 9-22 | Clay loam, sandy clay loam, loam. | SC, CL | A-6 | 0 | 90-100 | 85-100 | 80-100 | 35-85 | 30-40 | 11-20 |
| | 22-41 | Silty clay loam, loam, sandy loam. | SM, ML, CL-ML, SM-SC | A-2, A-4 | 0 | 90-100 | 85-100 | 55-95 | 30-70 | <20 | NP-5 |
| | 41 | Unweathered bedrock. | --- | --- | --- | --- | --- | --- | --- | --- | --- |

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

| Soil name and map symbol | Depth | USDA texture | Classification |  | Frag- ments > 3 inches | Percentage passing sieve number-- |  |  |  | Liquid limit | Plas- ticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | Unified | AASHTO |  | 4 | 10 | 40 | 200 |  |  |
|  | In |  |  |  | Pct |  |  |  |  | Pct |  |
| 27C, 27D---------<br>Sequoia | 0-6 | Loam------------- | CL, CL-ML | A-4, A-6 | 0 | 95-100 | 95-100 | 85-100 | 80-95 | 23-35 | 5-15 |
|  | 6-39 | Silty clay, clay, shaly silty clay. | CL, MH, CH | A-7 | 0 | 70-100 | 65-100 | 60-100 | 55-95 | 43-74 | 20-40 |
|  | 39 | Weathered bedrock | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28B--------------<br>State | 0-11 | Fine sandy loam | SM, ML, CL-ML, SM-SC | A-2, A-4 | 0 | 95-100 | 95-100 | 45-85 | 25-55 | <28 | NP-7 |
|  | 11-39 | Loam, clay loam, sandy clay loam. | CL, SC | A-4, A-6 | 0 | 95-100 | 95-100 | 75-100 | 35-80 | 24-40 | 8-22 |
|  | 39-72 | Stratified sand to fine sandy loam. | SM, SM-SC, SP-SM | A-1, A-2, A-3, A-4 | 0 | 85-100 | 75-100 | 40-90 | 5-50 | <25 | NP-7 |
| 29D, 29E---------<br>Sweetapple | 0-5 | Fine sandy loam | SM, SM-SC | A-2, A-4 | 0-2 | 80-100 | 75-95 | 50-80 | 30-40 | <30 | NP-7 |
|  | 5-17 | Fine sandy loam, sandy loam, loam. | SM, SM-SC | A-2, A-4 | 0-2 | 80-100 | 75-100 | 50-80 | 30-50 | <30 | NP-7 |
|  | 17-39 | Gravelly sandy loam, gravelly loamy coarse sand. | SM | A-2-4 | 0-15 | 80-100 | 75-95 | 50-70 | 20-30 | --- | NP |
|  | 39-65 | Weathered bedrock | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30B, 30C, 30D----<br>Tatum | 0-6 | Gravelly loam---- | GM, ML, SM | A-4 | 0-10 | 60-80 | 55-75 | 45-75 | 40-70 | 22-36 | 2-10 |
|  | 6-43 | Silty clay loam, silty clay, gravelly clay. | MH, GM, SM | A-7 | 0-10 | 60-100 | 55-98 | 50-96 | 45-90 | 50-80 | 10-36 |
|  | 43-47 | Variable--------- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 47 | Weathered bedrock | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31B, 31C, 31D----<br>Thurmont | 0-11 | Fine sandy loam | SM, ML, CL, SM-SC | A-2, A-4 | 0-3 | 80-100 | 75-100 | 55-70 | 25-65 | <30 | NP-10 |
|  | 11-44 | Clay loam, loam, gravelly sandy clay loam. | SC, CL | A-2, A-6, A-7 | 0-5 | 80-100 | 70-90 | 65-80 | 30-60 | 30-45 | 12-20 |
|  | 44-53 | Sandy loam, sandy clay loam, gravelly sandy clay loam. | SC | A-2, A-6, A-7 | 0-5 | 75-90 | 70-90 | 45-75 | 30-45 | 30-45 | 12-25 |
|  | 53-72 | Cobbly sandy loam, gravelly sandy clay loam. | SM, SM-SC | A-1, A-2 | 0-30 | 70-85 | 50-75 | 30-50 | 15-35 | <20 | NP-7 |
| 32A--------------<br>Toccoa | 0-7 | Sandy loam------- | SM | A-2, A-4 | 0 | 95-100 | 95-100 | 85-100 | 25-50 | <30 | NP-4 |
|  | 7-72 | Sandy loam, loam | SM, ML | A-2, A-4 | 0 | 95-100 | 90-100 | 60-100 | 30-55 | <30 | NP-4 |
| 33B, 33C, 33D----<br>Turbeville | 0-9 | Fine sandy loam | SM, ML, CL-ML, SM-SC | A-2, A-4 | 0-2 | 80-100 | 75-100 | 50-85 | 25-55 | <25 | NP-5 |
|  | 9-12 | Loam, clay loam, sandy clay loam. | CL, SC | A-4, A-6, A-7 | 0-2 | 90-100 | 80-100 | 60-100 | 35-75 | 30-45 | 8-20 |
|  | 12-72 | Clay loam, sandy clay, clay. | CL, CH | A-7 | 0-5 | 90-100 | 80-100 | 65-100 | 55-95 | 45-65 | 20-35 |
| 34B, 34C---------<br>Vance | 0-12 | Fine sandy loam | SM, SM-SC | A-2, A-4 | 0-5 | 90-100 | 80-100 | 55-80 | 15-40 | <27 | NP-7 |
|  | 12-40 | Clay loam, sandy clay, clay. | CH | A-7 | 0-5 | 95-100 | 90-100 | 75-95 | 65-80 | 51-80 | 25-48 |
|  | 40-72 | Variable--------- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

| Soil name and map symbol | Depth | USDA texture | Classification | | Fragments > 3 inches | Percentage passing sieve number-- | | | | Liquid limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | | 4 | 10 | 40 | 200 | | |
| | In | | | | Pct | | | | | Pct | |
| 35D, 35E----------<br>Wateree | 0-6 | Fine sandy loam | SM | A-2 | 0-5 | 80-100 | 75-95 | 45-80 | 25-35 | <30 | NP-7 |
| | 6-19 | Sandy loam-------- | SM | A-2, A-4 | 0-5 | 85-100 | 75-98 | 50-80 | 25-40 | <30 | NP-7 |
| | 19-39 | Sand, loamy sand, sandy loam. | SP-SM, SM | A-1, A-2, A-3 | 0-5 | 70-100 | 65-98 | 40-80 | 5-35 | <25 | NP-3 |
| | 39-59 | Weathered bedrock | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 59 | Unweathered bedrock. | --- | --- | --- | --- | --- | --- | --- | --- | --- |

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

| Soil name and map symbol | Depth | Clay | Moist bulk density | Permeability | Available water capacity | Soil reaction | Shrink-swell potential | Erosion factors | | Organic matter |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | K | T | |
| | In | Pct | g/cc | In/hr | In/in | pH | | | | Pct |
| 1B | 0-8 | 10-24 | 1.30-1.50 | 2.0-6.0 | 0.12-0.20 | 4.5-6.0 | Low | 0.24 | 5 | .5-3 |
| Altavista | 8-72 | 18-35 | 1.30-1.50 | 0.6-2.0 | 0.12-0.20 | 4.5-6.0 | Low | 0.24 | | |
| 2D, 2E | 0-5 | 10-25 | 1.30-1.50 | 2.0-6.0 | 0.16-0.24 | 4.5-6.0 | Low | 0.15 | 2 | 1-3 |
| Ashe | 5-23 | 20-35 | 1.30-1.40 | 0.6-2.0 | 0.15-0.20 | 4.5-6.0 | Low | 0.17 | | |
| | 23 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3C, 3D, 3E | 0-11 | 5-23 | 1.20-1.50 | 0.6-6.0 | 0.08-0.12 | 3.6-6.5 | Low | 0.17 | 3 | .5-3 |
| Berks | 11-21 | 5-32 | 1.20-1.60 | 0.6-6.0 | 0.04-0.10 | 3.6-6.5 | Low | 0.17 | | |
| | 21-36 | 5-20 | 1.20-1.60 | 2.0-6.0 | 0.04-0.10 | 3.6-6.5 | Low | 0.17 | | |
| | 36 | --- | --- | --- | --- | --- | --- | --- | | |
| 4B, 4C, 4D | 0-11 | 10-25 | 1.20-1.50 | 0.6-6.0 | 0.14-0.19 | 3.6-5.5 | Low | 0.32 | 4 | 1-2 |
| Braddock | 11-48 | 35-55 | 1.20-1.50 | 0.6-2.0 | 0.12-0.17 | 3.6-5.5 | Moderate | 0.24 | | |
| | 48-72 | 25-45 | 1.20-1.50 | 0.6-6.0 | 0.06-0.12 | 3.6-5.5 | Low | 0.24 | | |
| 5B, 5C | 0-11 | 10-25 | 1.00-1.20 | 0.6-6.0 | 0.10-0.19 | 3.6-5.5 | Low | 0.24 | 4 | 1-2 |
| Braddock | 11-48 | 35-55 | 1.20-1.50 | 0.6-2.0 | 0.14-0.19 | 3.6-5.5 | Moderate | 0.20 | | |
| | 48-72 | 25-45 | 1.20-1.50 | 0.6-6.0 | 0.06-0.12 | 3.6-5.5 | Low | 0.24 | | |
| 6C, 6D | 0-11 | 10-25 | 1.00-1.20 | 0.6-6.0 | 0.14-0.19 | 3.6-5.5 | Low | 0.24 | 4 | 1-2 |
| Braddock | 11-48 | 35-55 | 1.20-1.50 | 0.6-2.0 | 0.14-0.19 | 3.6-5.5 | Moderate | 0.24 | | |
| | 48-72 | 25-45 | 1.20-1.50 | 0.6-6.0 | 0.06-0.12 | 3.6-5.5 | Low | 0.24 | | |
| 7B, 7C | 0-6 | 5-20 | 1.30-1.50 | 2.0-6.0 | 0.12-0.14 | 4.5-6.0 | Low | 0.28 | 4 | .5-2 |
| Cecil | 6-9 | 20-35 | 1.30-1.50 | 0.6-2.0 | 0.13-0.15 | 4.5-6.0 | Low | 0.28 | | |
| | 9-56 | 35-70 | 1.30-1.50 | 0.6-2.0 | 0.13-0.15 | 4.5-5.5 | Low | 0.28 | | |
| | 56-72 | --- | --- | --- | --- | --- | --- | --- | | |
| 8A | 0-10 | 10-27 | 1.30-1.60 | 0.6-2.0 | 0.15-0.24 | 4.5-6.5 | Low | 0.28 | 5 | 1-4 |
| Chewacla | 10-24 | 18-35 | 1.30-1.50 | 0.6-2.0 | 0.15-0.24 | 4.5-6.5 | Low | 0.32 | | |
| | 24-38 | 18-35 | 1.30-1.60 | 0.6-2.0 | 0.12-0.20 | 4.5-6.5 | Low | 0.28 | | |
| | 38-72 | --- | --- | --- | --- | --- | --- | --- | | |
| 9B, 9C, 9D | 0-5 | 15-27 | 1.20-1.50 | 2.0-6.0 | 0.14-0.19 | 5.1-6.0 | Low | 0.37 | 4 | 1-3 |
| Cullen | 5-62 | 35-70 | 1.30-1.60 | 0.6-2.0 | 0.10-0.14 | 5.1-6.0 | Moderate | 0.24 | | |
| | 62-72 | 20-50 | 1.30-1.50 | 0.6-2.0 | 0.14-0.19 | 5.1-6.0 | Moderate | 0.24 | | |
| 10D, 10E | 0-5 | 10-20 | 1.20-1.50 | 6.0-20 | 0.08-0.12 | 3.6-6.5 | Low | 0.17 | 2 | 2-4 |
| Dekalb | 5-20 | 7-18 | 1.20-1.50 | 6.0-20 | 0.06-0.12 | 3.6-5.5 | Low | 0.17 | | |
| | 20-25 | 5-15 | 1.20-1.50 | >6.0 | 0.05-0.10 | 3.6-5.5 | Low | 0.17 | | |
| | 25 | --- | --- | --- | --- | --- | --- | --- | | |
| 11C, 11D, 11E | 0-5 | 5-15 | 1.40-1.60 | 2.0-6.0 | 0.11-0.17 | 4.5-6.0 | Low | 0.20 | 3 | 1-3 |
| Edneytown | 5-31 | 20-35 | 1.30-1.40 | 0.6-2.0 | 0.12-0.18 | 4.5-5.5 | Low | 0.24 | | |
| | 31-40 | 10-22 | 1.30-1.50 | 0.6-2.0 | 0.11-0.14 | 4.5-5.5 | Low | 0.24 | | |
| | 40-72 | 4-15 | 1.30-1.50 | 2.0-6.0 | 0.06-0.12 | 4.5-5.5 | Low | 0.17 | | |
| 12C, 12D, 12E | 0-5 | 5-15 | 1.40-1.60 | 2.0-6.0 | 0.11-0.17 | 4.5-6.0 | Low | 0.10 | 3 | 1-3 |
| Edneytown | 5-31 | 20-35 | 1.30-1.40 | 0.6-2.0 | 0.12-0.18 | 4.5-5.5 | Low | 0.24 | | |
| | 31-40 | 10-22 | 1.30-1.50 | 0.6-2.0 | 0.11-0.14 | 4.5-5.5 | Low | 0.24 | | |
| | 40-72 | 4-15 | 1.30-1.50 | 2.0-6.0 | 0.06-0.12 | 4.5-5.5 | Low | 0.17 | | |
| 13D, 13E | 0-6 | 5-25 | 1.40-1.60 | 2.0-6.0 | 0.10-0.15 | 4.5-6.0 | Low | 0.17 | 5 | 1-3 |
| Edneyville | 6-61 | 7-20 | 1.40-1.60 | 0.6-2.0 | 0.12-0.16 | 4.5-6.0 | Low | 0.20 | | |
| 14C, 14D, 14E | 0-9 | 4-18 | 1.45-1.65 | 2.0-6.0 | 0.07-0.10 | 4.5-6.5 | Low | 0.24 | 3 | .5-2 |
| Grover | 9-36 | 18-35 | 1.25-1.40 | 0.6-2.0 | 0.12-0.14 | 4.5-5.5 | Low | 0.32 | | |
| | 36-72 | 4-25 | 1.60-1.75 | 0.6-2.0 | 0.06-0.10 | 4.5-5.5 | Low | 0.32 | | |

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

| Soil name and map symbol | Depth | Clay | Moist bulk density | Permeability | Available water capacity | Soil reaction | Shrink-swell potential | Erosion factors | | Organic matter |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | K | T | |
| | In | Pct | g/cc | In/hr | In/in | pH | | | | Pct |
| 15C, 15D, 15E | 0-8 | 10-27 | 1.25-1.35 | 2.0-6.0 | 0.10-0.16 | 4.5-5.5 | Low | 0.20 | 2 | .5-2 |
| Gunstock | 8-23 | 28-35 | 1.30-1.35 | 0.6-2.0 | 0.10-0.14 | 4.5-5.5 | Moderate | 0.20 | | |
| | 23-34 | 28-35 | 1.20-1.40 | 0.6-2.0 | 0.06-0.10 | 4.5-5.5 | Low | 0.15 | | |
| | 34 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 16B, 16C, 16D, 16E | 0-6 | 10-25 | 1.35-1.60 | 2.0-6.0 | 0.12-0.20 | 4.5-6.0 | Low | 0.20 | 5 | 1-3 |
| Hayesville | 6-40 | 30-50 | 1.20-1.35 | 0.6-2.0 | 0.15-0.20 | 4.5-6.0 | Low | 0.24 | | |
| | 40-51 | 20-40 | 1.30-1.40 | 0.6-2.0 | 0.12-0.20 | 4.5-6.0 | Low | 0.20 | | |
| | 51-72 | 5-15 | 1.45-1.65 | 2.0-6.0 | 0.11-0.15 | 4.5-6.0 | Low | 0.17 | | |
| 17C, 17D, 17E | 0-6 | 12-26 | 1.20-1.50 | 2.0-6.0 | 0.12-0.20 | 4.5-5.5 | Low | 0.24 | 4 | 1-3 |
| Hayesville | 6-40 | 35-65 | 1.30-1.60 | 0.6-2.0 | 0.15-0.20 | 4.5-5.5 | Low | 0.28 | | |
| | 40-51 | 25-40 | 1.25-1.55 | 0.6-2.0 | 0.12-0.20 | 4.5-5.5 | Low | 0.28 | | |
| | 51-72 | 5-20 | 1.20-1.50 | 2.0-6.0 | 0.11-0.15 | 4.5-5.5 | Low | 0.28 | | |
| 18B, 18C | 0-9 | 5-20 | 1.58-1.62 | 2.0-6.0 | 0.10-0.12 | 4.5-6.0 | Low | 0.15 | 3 | .5-2 |
| Helena | 9-13 | 20-35 | 1.46-1.56 | 0.2-0.6 | 0.13-0.15 | 4.5-5.5 | Moderate | 0.28 | | |
| | 13-59 | 35-60 | 1.44-1.55 | 0.06-0.2 | 0.13-0.15 | 4.5-5.5 | High | 0.28 | | |
| | 59-72 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 19B, 19C | 0-11 | 10-20 | 1.30-1.70 | 2.0-6.0 | 0.12-0.15 | 5.1-7.3 | Low | 0.28 | 3 | .5-2 |
| Iredell | 11-27 | 40-60 | 1.20-1.50 | 0.06-0.2 | 0.16-0.22 | 6.1-7.3 | Very high | 0.20 | | |
| | 27-37 | 15-35 | 1.30-1.60 | 0.06-0.2 | 0.14-0.18 | 6.1-7.8 | High | 0.28 | | |
| | 37-72 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 20B, 20C | 0-7 | 7-20 | 1.20-1.40 | 0.6-6.0 | 0.09-0.12 | 3.6-5.5 | Low | 0.24 | 4 | 1-4 |
| Laidig | 7-36 | 18-35 | 1.30-1.50 | 0.6-6.0 | 0.08-0.12 | 3.6-5.5 | Low | 0.24 | | |
| | 36-72 | 18-35 | 1.30-1.60 | 0.2-0.6 | 0.06-0.10 | 3.6-5.5 | Low | 0.17 | | |
| 21D3, 21E3 | 0-7 | 25-35 | 1.30-1.40 | 0.6-2.0 | 0.12-0.16 | 4.5-6.0 | Low | 0.28 | 4 | .5-2 |
| Madison | 7-25 | 30-50 | 1.20-1.40 | 0.6-2.0 | 0.13-0.18 | 4.5-5.5 | Low | 0.32 | | |
| | 25-30 | 25-35 | 1.30-1.40 | 0.6-2.0 | 0.12-0.16 | 4.5-6.0 | Low | 0.28 | | |
| | 30-72 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 22D, 22E | 0-7 | 7-27 | 1.25-1.55 | 2.0-6.0 | 0.10-0.16 | 3.6-5.5 | Low | 0.28 | 1 | .5-2 |
| Manteo | 7-17 | 10-35 | 1.35-1.65 | 2.0-6.0 | 0.07-0.14 | 3.6-5.5 | Low | 0.28 | | |
| | 17 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 23B, 23C | 0-10 | 5-27 | 1.25-1.55 | 0.6-6.0 | 0.08-0.20 | 4.5-5.5 | Low | 0.32 | 3 | .5-2 |
| Mattaponi | 10-65 | 35-65 | 1.40-1.70 | 0.2-0.6 | 0.12-0.18 | 4.5-5.5 | Moderate | 0.28 | | |
| 24B, 24C, 24D | 0-5 | 8-25 | 1.30-1.50 | 0.6-2.0 | 0.14-0.19 | 5.6-7.3 | Low | 0.24 | 4 | .5-2 |
| Mecklenburg | 5-17 | 40-60 | 1.40-1.60 | 0.06-0.2 | 0.12-0.14 | 5.6-7.3 | Moderate | 0.32 | | |
| | 17-40 | 20-35 | 1.40-1.60 | 0.6-2.0 | 0.12-0.14 | 5.6-7.3 | Low | 0.32 | | |
| | 40-72 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 25C, 25D, 25E | 0-5 | 6-12 | 1.35-1.45 | 0.6-2.0 | 0.14-0.20 | 4.5-6.5 | Low | 0.24 | 4 | 2-5 |
| Nason | 5-33 | 28-53 | 1.40-1.50 | 0.6-2.0 | 0.12-0.19 | 4.5-5.5 | Moderate | 0.32 | | |
| | 33-48 | 10-35 | 1.45-1.55 | 0.6-2.0 | 0.15-0.20 | 4.5-5.5 | Low | 0.24 | | |
| | 48 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 26C, 26D, 26E | 0-9 | 5-18 | 1.30-1.55 | 2.0-6.0 | 0.08-0.15 | 5.1-7.3 | Low | 0.28 | 3 | .5-2 |
| Poindexter | 9-22 | 20-35 | 1.35-1.45 | 0.6-2.0 | 0.13-0.19 | 5.1-7.3 | Low | 0.24 | | |
| | 22-41 | 10-35 | 1.30-1.55 | 2.0-6.0 | 0.08-0.15 | 5.1-7.3 | Low | 0.24 | | |
| | 41 | --- | --- | --- | --- | --- | ------------- | ---- | | |
| 27C, 27D | 0-6 | 15-27 | 1.30-1.50 | 0.6-2.0 | 0.17-0.20 | 4.5-5.5 | Low | 0.37 | 3 | .5-2 |
| Sequoia | 6-39 | 35-60 | 1.35-1.55 | 0.2-0.6 | 0.08-0.16 | 4.5-5.5 | Moderate | 0.24 | | |
| | 39 | --- | --- | --- | --- | --- | ------------- | ---- | | |

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

| Soil name and map symbol | Depth | Clay | Moist bulk density | Permeability | Available water capacity | Soil reaction | Shrink-swell potential | Erosion factors | | Organic matter |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | K | T | |
| | In | Pct | g/cc | In/hr | In/in | pH | | | | Pct |
| 28B | 0-11 | 5-15 | 1.25-1.40 | 0.6-6.0 | 0.08-0.15 | 4.5-5.5 | Low | 0.28 | 5 | <2 |
| State | 11-39 | 18-34 | 1.35-1.50 | 0.6-2.0 | 0.14-0.19 | 4.5-5.5 | Low | 0.28 | | |
| | 39-72 | 2-15 | 1.35-1.50 | >2.0 | 0.02-0.10 | 4.5-6.0 | Low | 0.17 | | |
| 29D, 29E | 0-5 | 10-15 | 1.30-1.50 | 2.0-6.0 | 0.12-0.16 | 4.5-6.0 | Low | 0.28 | 2 | 2-5 |
| Sweetapple | 5-17 | 5-17 | 1.30-1.50 | 2.0-6.0 | 0.10-0.15 | 4.5-6.0 | Low | 0.28 | | |
| | 17-39 | 5-10 | 1.25-1.45 | 2.0-6.0 | 0.10-0.14 | 4.5-6.5 | Low | 0.28 | | |
| | 39-65 | --- | --- | --- | --- | --- | --- | --- | | |
| 30B, 30C, 30D | 0-6 | 12-27 | 1.10-1.40 | 0.6-2.0 | 0.10-0.17 | 4.5-5.5 | Low | 0.24 | 4 | .5-2 |
| Tatum | 6-43 | 48-60 | 1.40-1.60 | 0.6-2.0 | 0.12-0.18 | 4.5-5.5 | Moderate | 0.28 | | |
| | 43-47 | --- | --- | --- | --- | --- | --- | --- | | |
| | 47 | --- | --- | --- | --- | --- | --- | --- | | |
| 31B, 31C, 31D | 0-11 | 10-25 | 1.20-1.40 | 2.0-6.0 | 0.10-0.15 | 4.5-5.5 | Low | 0.32 | 4 | .5-2 |
| Thurmont | 11-44 | 18-35 | 1.30-1.50 | 0.6-2.0 | 0.13-0.19 | 4.5-5.5 | Low | 0.20 | | |
| | 44-53 | 18-30 | 1.30-1.50 | 0.6-2.0 | 0.07-0.12 | 4.5-5.5 | Low | 0.20 | | |
| | 53-72 | 10-20 | 1.20-1.40 | 0.6-2.0 | 0.04-0.08 | 4.5-5.5 | Low | 0.20 | | |
| 32A | 0-7 | 2-15 | 1.40-1.55 | 2.0-6.0 | 0.09-0.12 | 5.1-6.5 | Low | 0.10 | 4 | 1-2 |
| Toccoa | 7-72 | 2-19 | 1.40-1.50 | 2.0-6.0 | 0.09-0.12 | 5.1-6.5 | Low | 0.10 | | |
| 33B, 33C, 33D | 0-9 | 8-18 | 1.35-1.55 | 2.0-6.0 | 0.08-0.15 | 4.5-5.5 | Low | 0.32 | 5 | .5-2 |
| Turbeville | 9-12 | 25-40 | 1.30-1.45 | 0.6-2.0 | 0.12-0.18 | 4.5-5.5 | Low | 0.28 | | |
| | 12-72 | 30-60 | 1.35-1.50 | 0.6-2.0 | 0.13-0.16 | 4.5-5.5 | Moderate | 0.24 | | |
| 34B, 34C | 0-12 | 8-20 | 1.45-1.70 | 2.0-6.0 | 0.10-0.14 | 4.5-6.0 | Low | 0.24 | 4 | .5-2 |
| Vance | 12-40 | 35-60 | 1.25-1.40 | 0.06-0.2 | 0.12-0.15 | 4.5-5.5 | Moderate | 0.37 | | |
| | 40-72 | --- | --- | --- | --- | --- | --- | --- | | |
| 35D, 35E | 0-6 | 5-18 | 1.40-1.60 | 2.0-6.0 | 0.08-0.12 | 4.5-6.0 | Low | 0.20 | 3 | <1 |
| Wateree | 6-19 | 5-18 | 1.30-1.60 | 2.0-6.0 | 0.08-0.12 | 4.5-6.0 | Low | 0.20 | | |
| | 19-39 | 2-15 | 1.40-1.70 | 2.0-6.0 | 0.04-0.12 | 3.6-6.0 | Low | 0.17 | | |
| | 39-59 | --- | --- | --- | --- | --- | --- | --- | | |
| | 59 | --- | --- | --- | --- | --- | --- | --- | | |

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

| Soil name and map symbol | Hydro-logic group | Flooding | | | High water table | | | Bedrock | | Potential frost action | Risk of corrosion | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Frequency | Duration | Months | Depth | Kind | Months | Depth | Hardness | | Uncoated steel | Concrete |
| | | | | | Ft | | | In | | | | |
| 1B<br>Altavista | C | Rare | --- | --- | 1.5-2.5 | Apparent | Dec-Mar | >60 | --- | --- | Moderate | Moderate. |
| 2D, 2E<br>Ashe | B | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | Moderate | Moderate. |
| 3C, 3D, 3E<br>Berks | C | None | --- | --- | >6.0 | --- | --- | 20-40 | Soft | Low | Low | High. |
| 4B, 4C, 4D, 5B, 5C, 6C, 6D<br>Braddock | B | None | --- | --- | >6.0 | --- | --- | >60 | --- | Moderate | High | Moderate. |
| 7B, 7C<br>Cecil | B | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | Moderate | Moderate. |
| 8A<br>Chewacla | C | Occasional | Brief | Nov-Apr | 0.5-1.5 | Apparent | Nov-Apr | >60 | --- | --- | High | Moderate. |
| 9B, 9C, 9D<br>Cullen | C | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | High | Moderate. |
| 10D, 10E<br>Dekalb | C | None | --- | --- | >6.0 | --- | --- | 20-40 | Hard | Low | Low | High. |
| 11C, 11D, 11E, 12C, 12D, 12E<br>Edneytown | B | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | Moderate | Moderate. |
| 13D, 13E<br>Edneyville | B | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | Low | High. |
| 14C, 14D, 14E<br>Grover | B | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | Moderate | Moderate. |
| 15C, 15D, 15E<br>Gunstock | C | None | --- | --- | >6.0 | --- | --- | 20-40 | Soft | Moderate | Low | High. |
| 16B, 16C, 16D, 16E<br>Hayesville | B | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | Moderate | Moderate. |
| 17C, 17D, 17E<br>Hayesville | C | None | --- | --- | >6.0 | --- | --- | >60 | --- | --- | Moderate | Moderate. |

TABLE 16.--SOIL AND WATER FEATURES--Continued

| Soil name and map symbol | Hydro-logic group | Flooding |  |  | High water table |  |  | Bedrock |  | Potential frost action | Risk of corrosion |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Frequency | Duration | Months | Depth | Kind | Months | Depth | Hardness |  | Uncoated steel | Concrete |
|  |  |  |  |  | Ft |  |  | In |  |  |  |  |
| 18B, 18C----------<br>Helena | C | None-------- | --- | --- | 1.5-2.5 | Perched | Jan-Apr | 40-60 | Soft | --- | High----- | High. |
| 19B, 19C----------<br>Iredell | C/D | None-------- | --- | --- | 1.0-2.0 | Perched | Dec-Apr | >60 | --- | --- | High----- | Low. |
| 20B, 20C----------<br>Laidig | C | None-------- | --- | --- | 2.5-4.0 | Perched | Jan-Mar | >60 | --- | Moderate | Moderate | High. |
| 21D3, 21E3--------<br>Madison | B | None-------- | --- | --- | >6.0 | --- | --- | >60 | --- | --- | High----- | Moderate. |
| 22D, 22E----------<br>Manteo | C/D | None-------- | --- | --- | >6.0 | --- | --- | 10-20 | Hard | --- | Low------ | High. |
| 23B, 23C----------<br>Mattaponi | C | None-------- | --- | --- | 3.0-6.0 | Perched | Dec-Mar | >60 | --- | --- | High----- | High. |
| 24B, 24C, 24D-----<br>Mecklenburg | C | None-------- | --- | --- | >6.0 | --- | --- | 40-60 | Soft | --- | High----- | Moderate. |
| 25C, 25D, 25E-----<br>Nason | B | None-------- | --- | --- | >6.0 | --- | --- | 40-60 | Soft | --- | Moderate | High. |
| 26C, 26D, 26E-----<br>Poindexter | B | None-------- | --- | --- | >6.0 | --- | --- | 40-60 | Hard | --- | Moderate | Moderate. |
| 27C, 27D----------<br>Sequoia | C | None-------- | --- | --- | >6.0 | --- | --- | 20-40 | Soft | --- | High----- | Moderate. |
| 28B---------------<br>State | B | Rare-------- | --- | --- | 4.0-6.0 | Apparent | Dec-Jun | >60 | --- | --- | Moderate | High. |
| 29D, 29E----------<br>Sweetapple | B | None-------- | --- | --- | >6.0 | --- | --- | 20-40 | Soft | --- | Low------ | Moderate. |
| 30B, 30C, 30D-----<br>Tatum | B | None-------- | --- | --- | >6.0 | --- | --- | 40-60 | Soft | --- | High----- | High. |
| 31B, 31C, 31D-----<br>Thurmont | B | None-------- | --- | --- | 4.0-6.0 | Apparent | Dec-Mar | >60 | --- | Moderate | Moderate | High. |
| 32A---------------<br>Toccoa | B | Frequent---- | Brief----- | Jan-Dec | 2.5-5.0 | Apparent | Dec-Apr | >60 | --- | --- | Low------ | Moderate. |
| 33B, 33C, 33D-----<br>Turbeville | C | None-------- | --- | --- | >6.0 | --- | --- | >60 | --- | --- | High----- | High. |
| 34B, 34C----------<br>Vance | C | None-------- | --- | --- | >6.0 | --- | --- | >60 | --- | --- | High----- | High. |

TABLE 16.--SOIL AND WATER FEATURES--Continued

| Soil name and map symbol | Hydro-logic group | Flooding | | | High water table | | | Bedrock | | Potential frost action | Risk of corrosion | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Frequency | Duration | Months | Depth | Kind | Months | Depth | Hardness | | Uncoated steel | Concrete |
| | | | | | Ft | | | In | | | | |
| 35D, 35F----------<br>Wateree | B | None-------- | --- | --- | >6.0 | --- | --- | 40-60 | Hard | --- | Low------ | High. |

TABLE 17.--CLASSIFICATION OF THE SOILS

| Soil name | Family or higher taxonomic class |
|---|---|
| Altavista | Fine-loamy, mixed, thermic Aquic Hapludults |
| Ashe | Fine-loamy, oxidic, mesic Typic Hapludults |
| Berks | Loamy-skeletal, mixed, mesic Typic Dystrochrepts |
| Braddock | Clayey, mixed, mesic Typic Hapludults |
| Cecil | Clayey, kaolinitic, thermic Typic Hapludults |
| Chewacla | Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts |
| Cullen | Clayey, mixed, thermic Typic Hapludults |
| Dekalb | Loamy-skeletal, mixed, mesic Typic Dystrochrepts |
| Edneytown | Fine-loamy, mixed, mesic Typic Hapludults |
| Edneyville | Coarse-loamy, mixed, mesic Typic Dystrochrepts |
| Gunstock | Fine-loamy, siliceous, mesic Typic Hapludults |
| Grover | Fine-loamy, micaceous, thermic Typic Hapludults |
| Hayesville | Clayey, oxidic, mesic Typic Hapludults |
| Helena | Clayey, mixed, thermic Aquic Hapludults |
| Iredell | Fine, montmorillonitic, thermic Typic Hapludalfs |
| Laidig | Fine-loamy, mixed, mesic Typic Fragiudults |
| Madison | Clayey, kaolinitic, thermic Typic Hapludults |
| Manteo | Loamy-skeletal, mixed, thermic Lithic Dystrochrepts |
| Mattaponi | Clayey, mixed, thermic Typic Hapludults |
| Mecklenburg | Fine, mixed, thermic Ultic Hapludalfs |
| Nason | Clayey, mixed, thermic Typic Hapludults |
| Poindexter | Fine-loamy, mixed, thermic Typic Hapludalfs |
| Sequoia | Clayey, mixed, mesic Typic Hapludults |
| State | Fine-loamy, mixed, thermic Typic Hapludults |
| Sweetapple | Coarse-loamy, micaceous, thermic Typic Dystrochrepts |
| Tatum | Clayey, mixed, thermic Typic Hapludults |
| Thurmont | Fine-loamy, mixed, mesic Typic Hapludults |
| Toccoa | Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents |
| Turbeville | Clayey, mixed, thermic Typic Paleudults |
| Vance | Clayey, mixed, thermic Typic Hapludults |
| Wateree | Coarse-loamy, mixed, thermic Typic Dystrochrepts |

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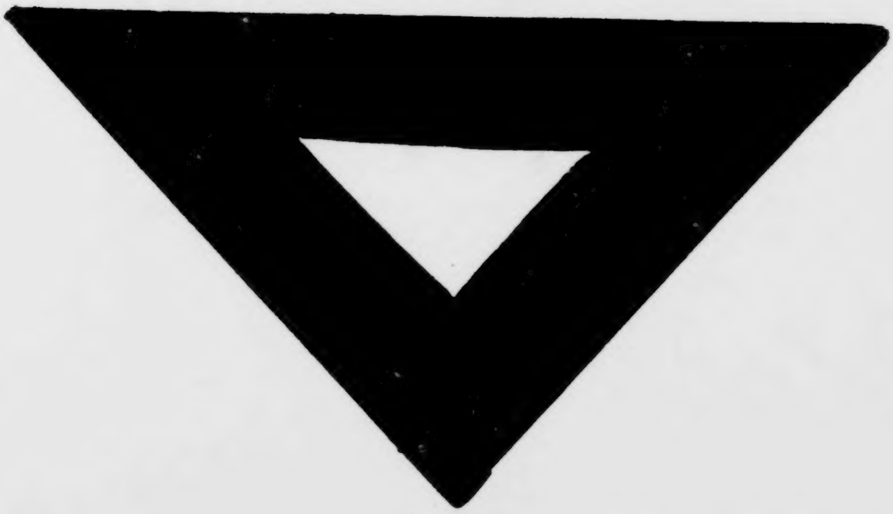
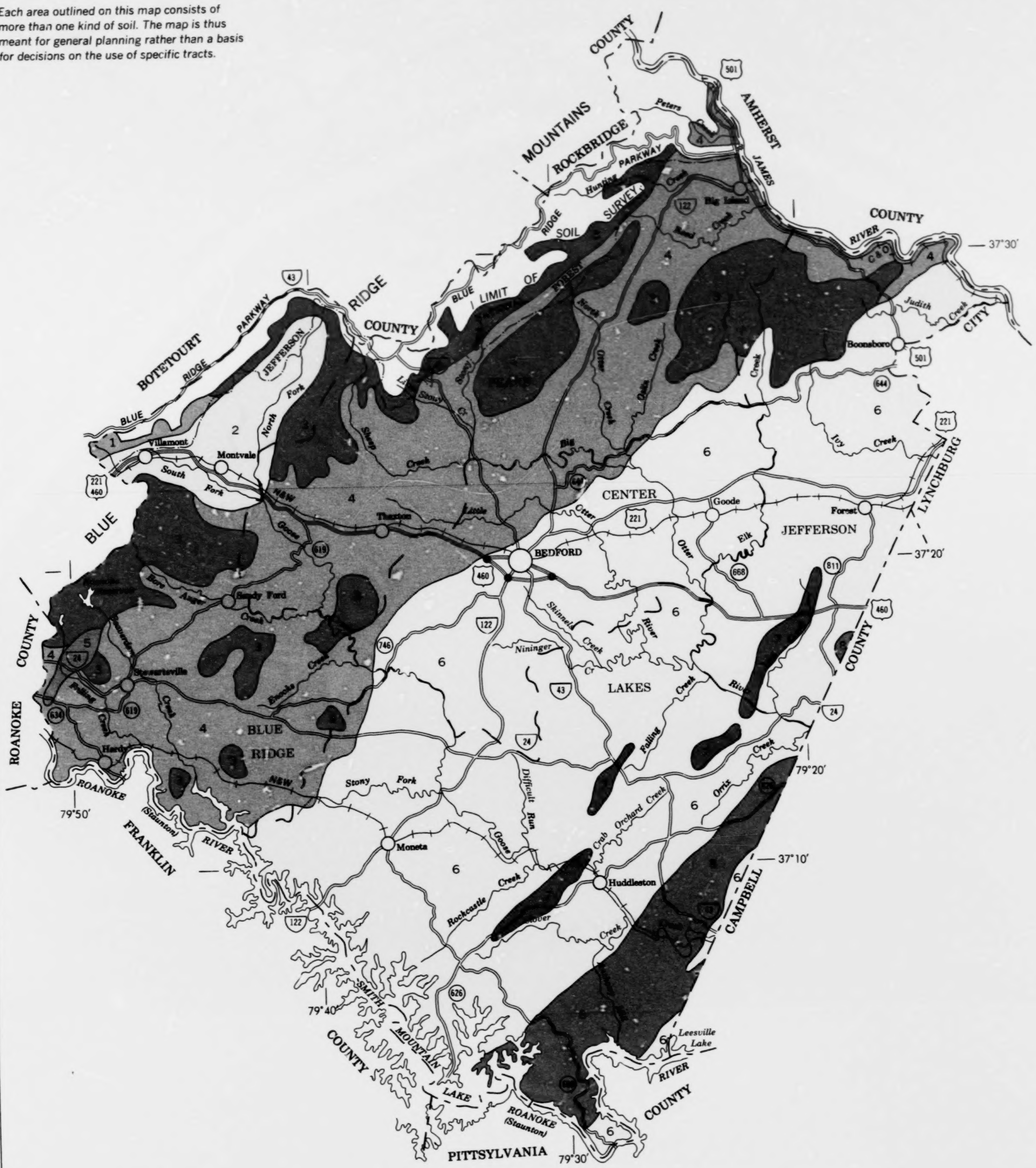
MAPS

TRANSPOSED TO

END OF VOLUME



*Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.*



## LEGEND

| | |
|---|---|
| 1 | DEKALB: Moderately deep, well drained, moderately steep to very steep, very stony soils that have a loamy subsoil; formed in weathered sandstone and quartzite |
| 2 | SEQUOIA-BERKS-BRADDOCK: Moderately deep and very deep, well drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered shale or in colluvial sediments |
| 3 | EDNEYTOWN-ASHE: Very deep and moderately deep, well drained and somewhat excessively drained, strongly sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered granite or granite gneiss or in both |
| 4 | HAYESVILLE-EDNEYTOWN-BRADDOCK: Very deep, well drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered granite or granite gneiss, in both, or in colluvial sediments |
| 5 | GUNSTOCK: Moderately deep, well drained, strongly sloping to steep soils that have a loamy subsoil; formed in weathered phyllite |
| 6 | CECIL-MADISON: Very deep, well drained, gently sloping to steep soils that have a clayey subsoil; formed in weathered mica schist and mica gneiss or in both and weathered granite gneiss |
| 7 | IREDELL-POINDEXTER-MECKLENBURG: Very deep and deep, somewhat poorly drained to well drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered hornblende gneiss, greenstone, diabase, or hornblende |
| 8 | NASON-TATUM-MANTEO: Deep and shallow, well drained and excessively drained, gently sloping to very steep soils that have a clayey or loamy subsoil; formed in weathered sericite schist |

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

# GENERAL SOIL MAP

## BEDFORD COUNTY, VIRGINIA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

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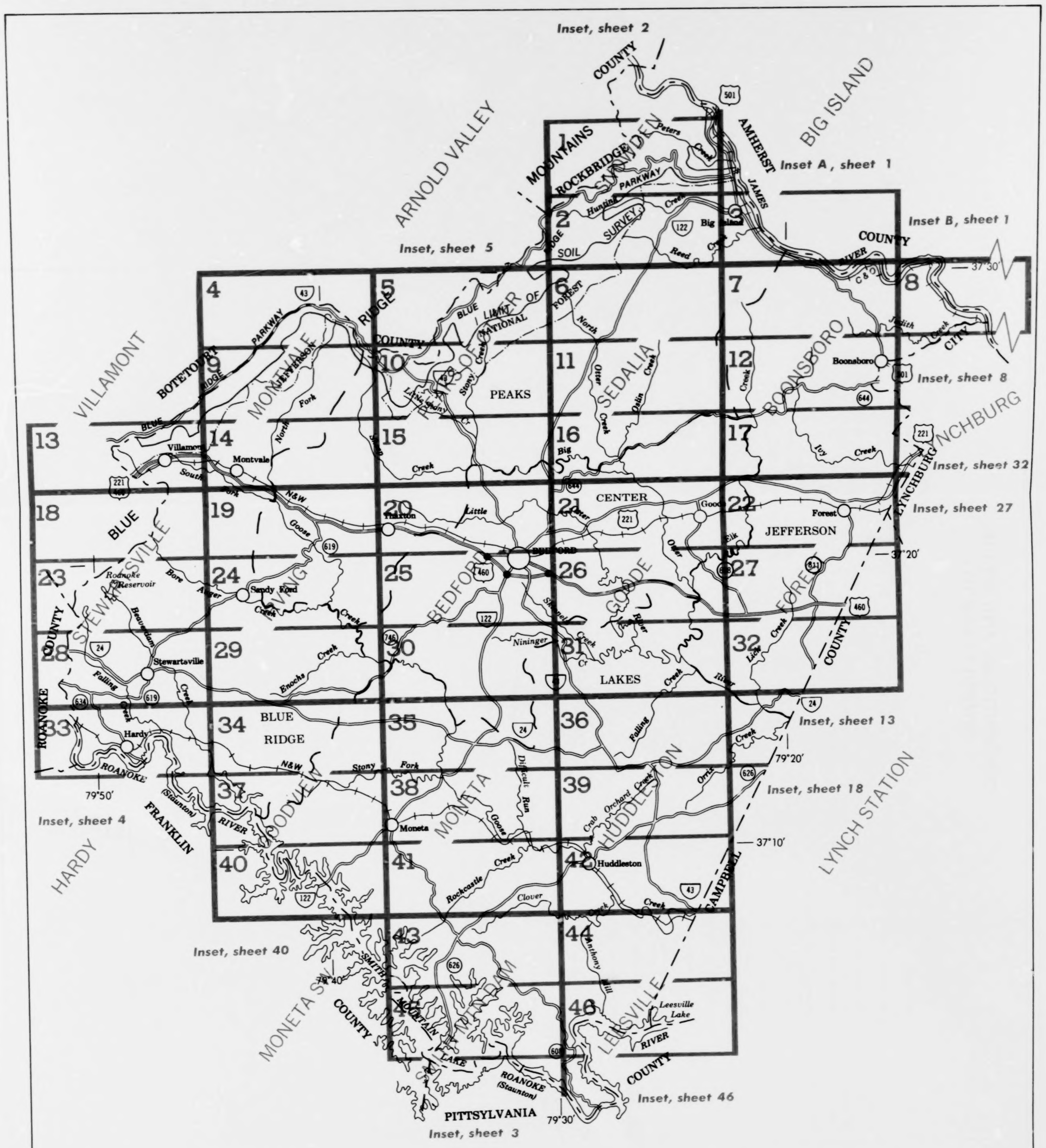

## INDEX TO MAP SHEETS

BEDFORD COUNTY, VIRGINIA

Scale 1:253,440

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U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

BEDFORD COUNTY, VIRGINIA

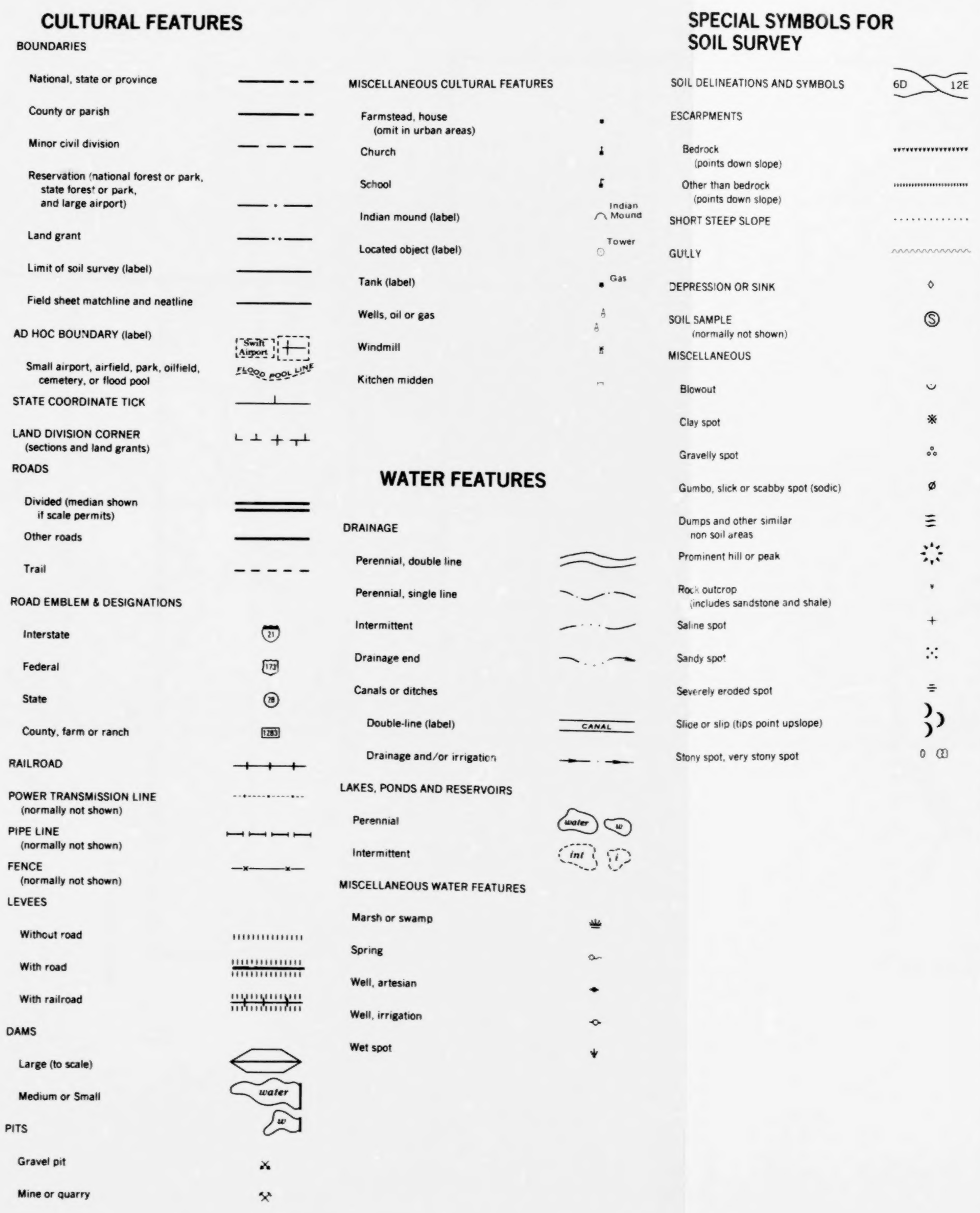
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

# SOIL LEGEND

Publication symbols consists of numbers or a combination of numbers and letters (e.g. 2D, 14C, or 26E). The initial numbers represent the kind of soil. A capital letter of A, B, C, D, or E following these numbers indicates the class of slope. The number following the capital letter represents the erosion.

| SYMBOL | NAME |
|---|---|
| 1B | Altavista fine sandy loam, 2 to 7 percent slopes |
| 2D | Ashe gravelly sandy loam, 15 to 25 percent slopes, very stony |
| 2E | Ashe gravelly sandy loam, 25 to 60 percent slopes, very stony |
| 3C | Berks channery loam, 7 to 15 percent slopes |
| 3D | Berks channery loam, 15 to 25 percent slopes |
| 3E | Berks channery loam, 25 to 60 percent slopes |
| 4B | Braddock fine sandy loam, 2 to 7 percent slopes |
| 4C | Braddock fine sandy loam, 7 to 15 percent slopes |
| 4D | Braddock fine sandy loam, 15 to 25 percent slopes |
| 5B | Braddock cobbly fine sandy loam, 2 to 7 percent slopes |
| 5C | Braddock cobbly fine sandy loam, 7 to 15 percent slopes |
| 6C | Braddock fine sandy loam, 7 to 15 percent slopes, very stony |
| 6D | Braddock fine sandy loam, 15 to 25 percent slopes, very stony |
| 7B | Cecil fine sandy loam, 2 to 7 percent slopes |
| 7C | Cecil fine sandy loam, 7 to 15 percent slopes |
| 8A | Chewacla loam, 0 to 2 percent slopes |
| 9B | Cullen loam, 2 to 7 percent slopes |
| 9C | Cullen loam, 7 to 15 percent slopes |
| 9D | Cullen loam, 15 to 25 percent slopes |
| 10D | Dekalb very channery sandy loam, 15 to 25 percent slopes, very stony |
| 10E | Dekalb very channery sandy loam, 25 to 60 percent slopes, very stony |
| 11C | Edneytown loam, 7 to 15 percent slopes |
| 11D | Edneytown loam, 15 to 25 percent slopes |
| 11E | Edneytown loam, 25 to 60 percent slopes |
| 12C | Edneytown loam, 7 to 15 percent slopes, extremely stony |
| 12D | Edneytown loam, 15 to 25 percent slopes, extremely stony |
| 12E | Edneytown loam, 25 to 60 percent slopes, extremely stony |
| 13D | Edneyville gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony |
| 13E | Edneyville gravelly fine sandy loam, 25 to 60 percent slopes, extremely stony |
| 14C | Grover fine sandy loam, 7 to 15 percent slopes |
| 14D | Grover fine sandy loam, 15 to 25 percent slopes |
| 14E | Grover fine sandy loam, 25 to 40 percent slopes |
| 15C | Gunstock channery loam, 7 to 15 percent slopes |
| 15D | Gunstock channery loam, 15 to 25 percent slopes |
| 15E | Gunstock channery loam, 25 to 45 percent slopes |
| 16B | Hayesville loam, 2 to 7 percent slopes |
| 16C | Hayesville loam, 7 to 15 percent slopes |
| 16D | Hayesville loam, 15 to 25 percent slopes |
| 16E | Hayesville loam, 25 to 45 percent slopes |
| 17C | Hayesville loam, 7 to 15 percent slopes, very stony |
| 17D | Hayesville loam, 15 to 25 percent slopes, very stony |
| 17E | Hayesville loam, 25 to 45 percent slopes, very stony |
| 18B | Helena fine sandy loam, 2 to 7 percent slopes |
| 18C | Helena fine sandy loam, 7 to 15 percent slopes |
| 19B | Iredell fine sandy loam, 2 to 7 percent slopes |
| 19C | Iredell fine sandy loam, 7 to 15 percent slopes |
| 20B | Laidig gravelly fine sandy loam, 2 to 7 percent slopes |
| 20C | Laidig gravelly fine sandy loam, 7 to 15 percent slopes |
| 21D3 | Madison sandy clay loam, 15 to 25 percent slopes, severely eroded |
| 21E3 | Madison sandy clay loam, 25 to 40 percent slopes, severely eroded |
| 22D | Manteo channery silt loam, 15 to 25 percent slopes |
| 22E | Manteo channery silt loam, 25 to 60 percent slopes |
| 23B | Mattaponi sandy loam, 2 to 7 percent slopes |
| 23C | Mattaponi sandy loam, 7 to 15 percent slopes |
| 24B | Mecklenburg loam, 2 to 7 percent slopes |
| 24C | Mecklenburg loam, 7 to 15 percent slopes |
| 24D | Mecklenburg loam, 15 to 25 percent slopes |
| 25C | Nason gravelly silt loam, 7 to 15 percent slopes |
| 25D | Nason gravelly silt loam, 15 to 25 percent slopes |
| 25E | Nason gravelly silt loam, 25 to 40 percent slopes |
| 26C | Poindexter fine sandy loam, 7 to 15 percent slopes |
| 26D | Poindexter fine sandy loam, 15 to 25 percent slopes |
| 26E | Poindexter fine sandy loam, 25 to 60 percent slopes |
| 27C | Sequoia loam, 7 to 15 percent slopes |
| 27D | Sequoia loam, 15 to 25 percent slopes |
| 28B | State fine sandy loam, 2 to 7 percent slopes |
| 29D | Sweetapple fine sandy loam, 15 to 25 percent slopes |
| 29E | Sweetapple fine sandy loam, 25 to 60 percent slopes |
| 30B | Tatum gravelly loam, 2 to 7 percent slopes |
| 30C | Tatum gravelly loam, 7 to 15 percent slopes |
| 30D | Tatum gravelly loam, 15 to 25 percent slopes |
| 31B | Thurmont fine sandy loam, 2 to 7 percent slopes |
| 31C | Thurmont fine sandy loam, 7 to 15 percent slopes |
| 31D | Thurmont fine sandy loam, 15 to 25 percent slopes |
| 32A | Toccoa sandy loam, 0 to 2 percent slopes |
| 33B | Turbeville fine sandy loam, 2 to 7 percent slopes |
| 33C | Turbeville fine sandy loam, 7 to 15 percent slopes |
| 33D | Turbeville fine sandy loam, 15 to 25 percent slopes |
| 34B | Vance fine sandy loam, 2 to 7 percent slopes |
| 34C | Vance fine sandy loam, 7 to 15 percent slopes |
| 35D | Wateree fine sandy loam, 15 to 25 percent slopes |
| 35E | Wateree fine sandy loam, 25 to 40 percent slopes |

# CONVENTIONAL AND SPECIAL SYMBOLS LEGEND



## CULTURAL FEATURES

BOUNDARIES
- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or Small

PITS
- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

## WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

## SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

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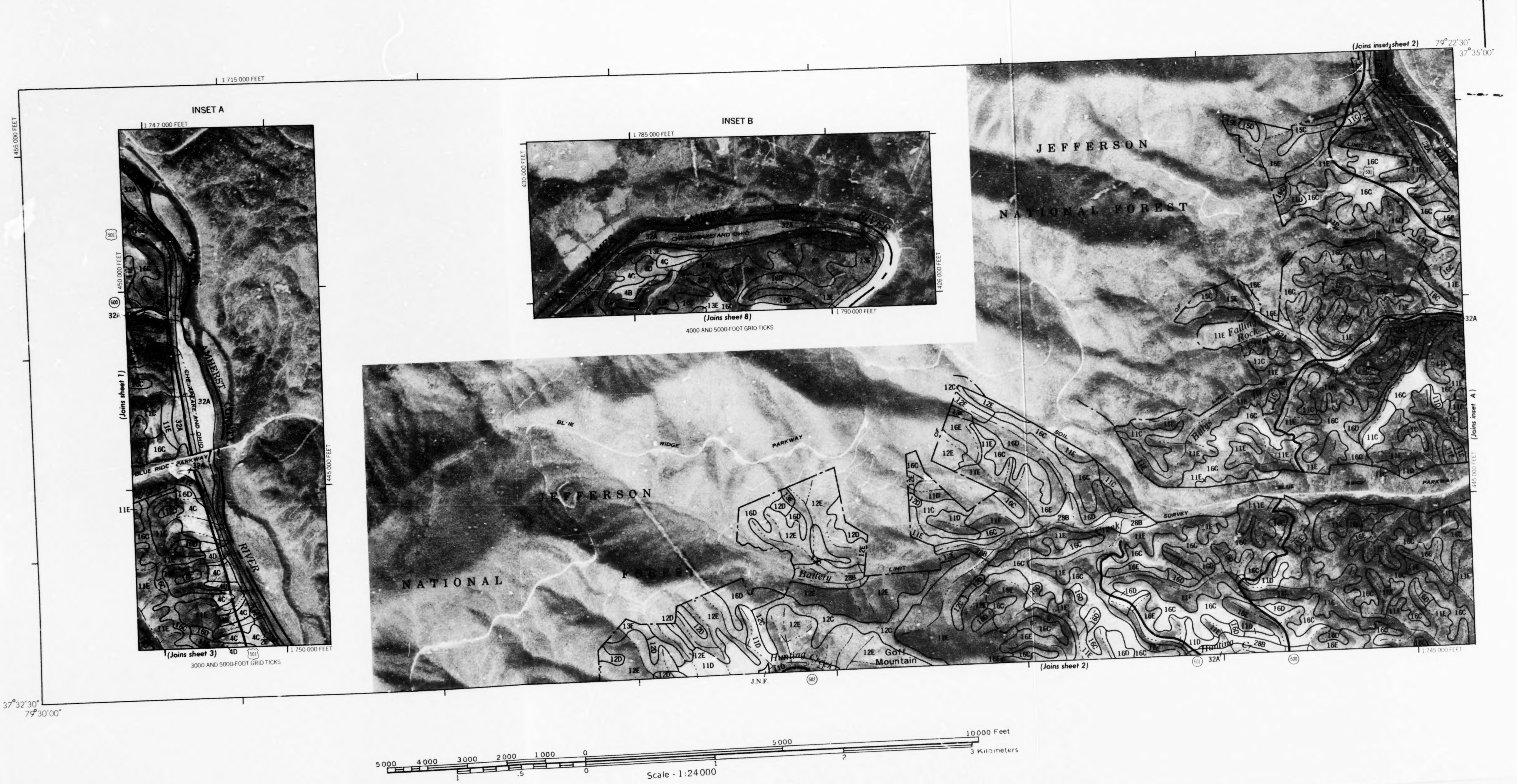

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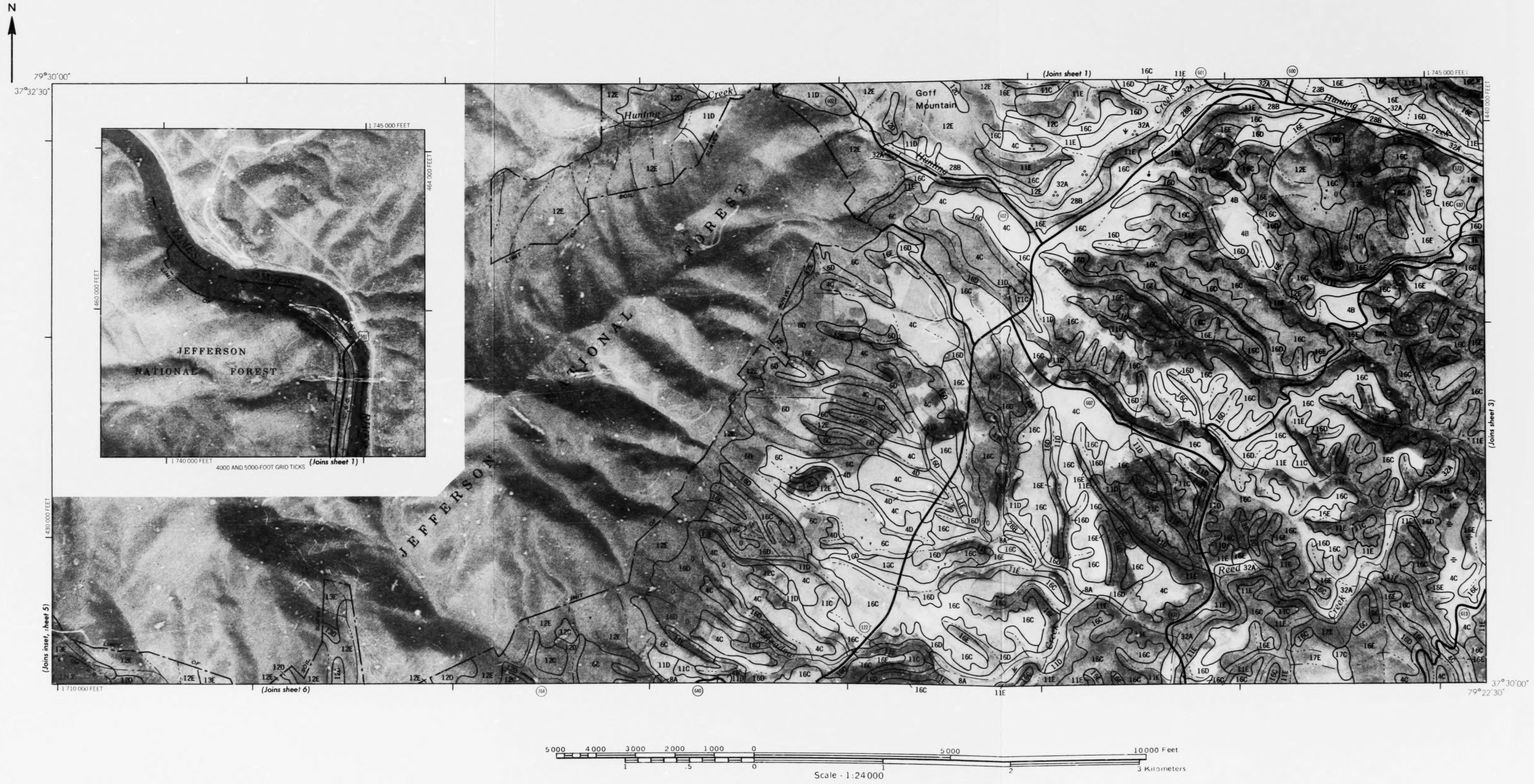

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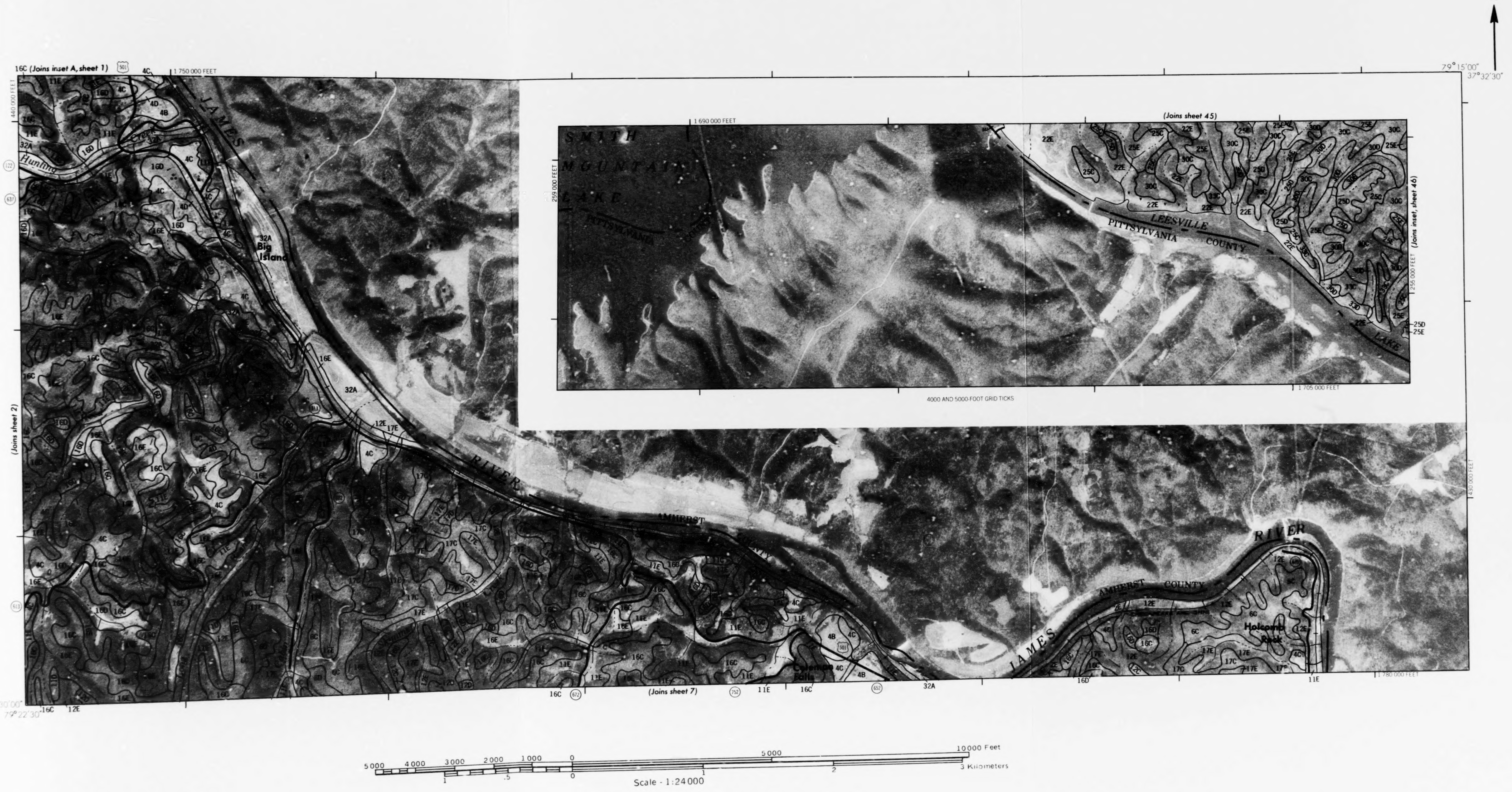

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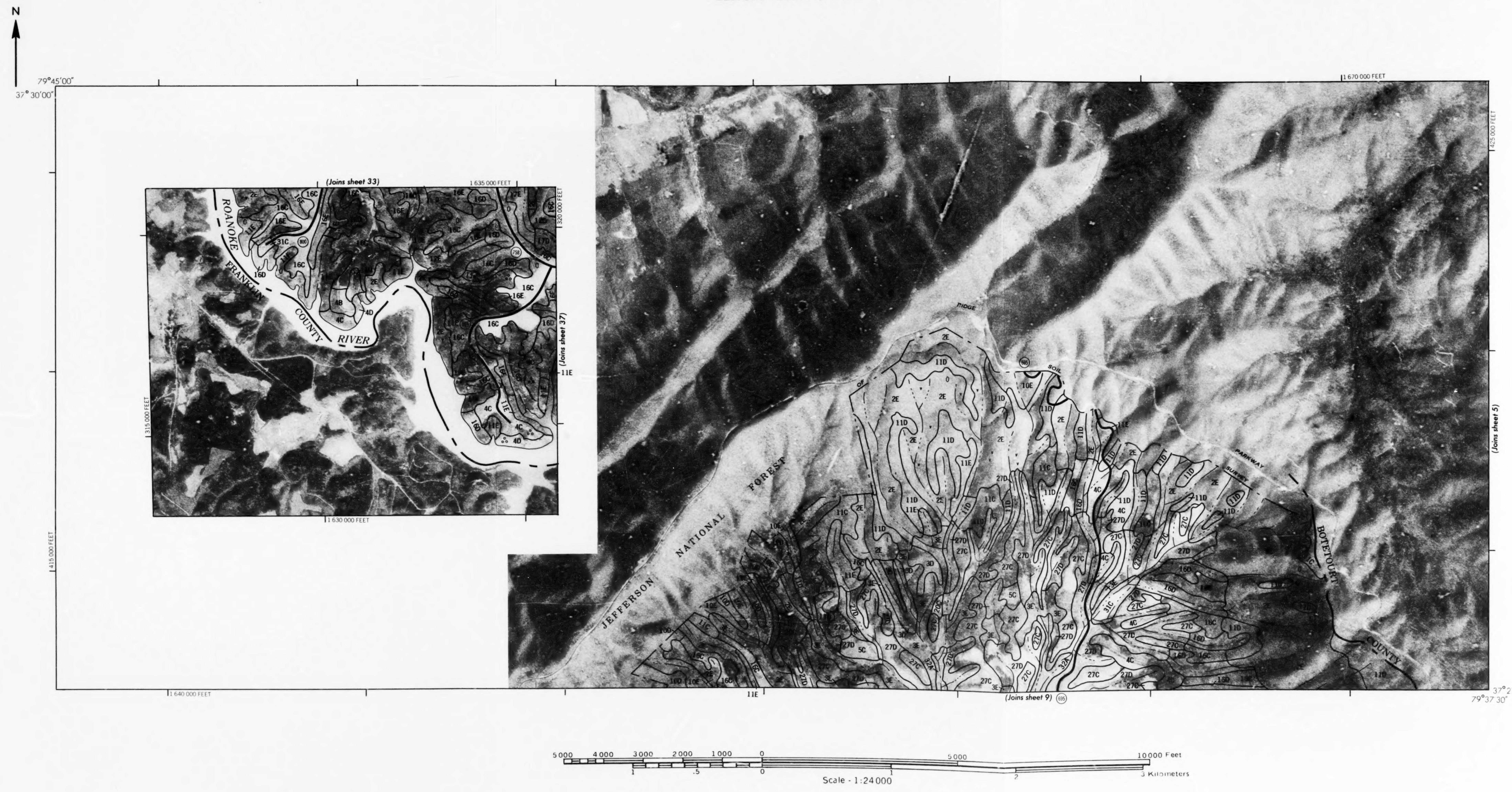

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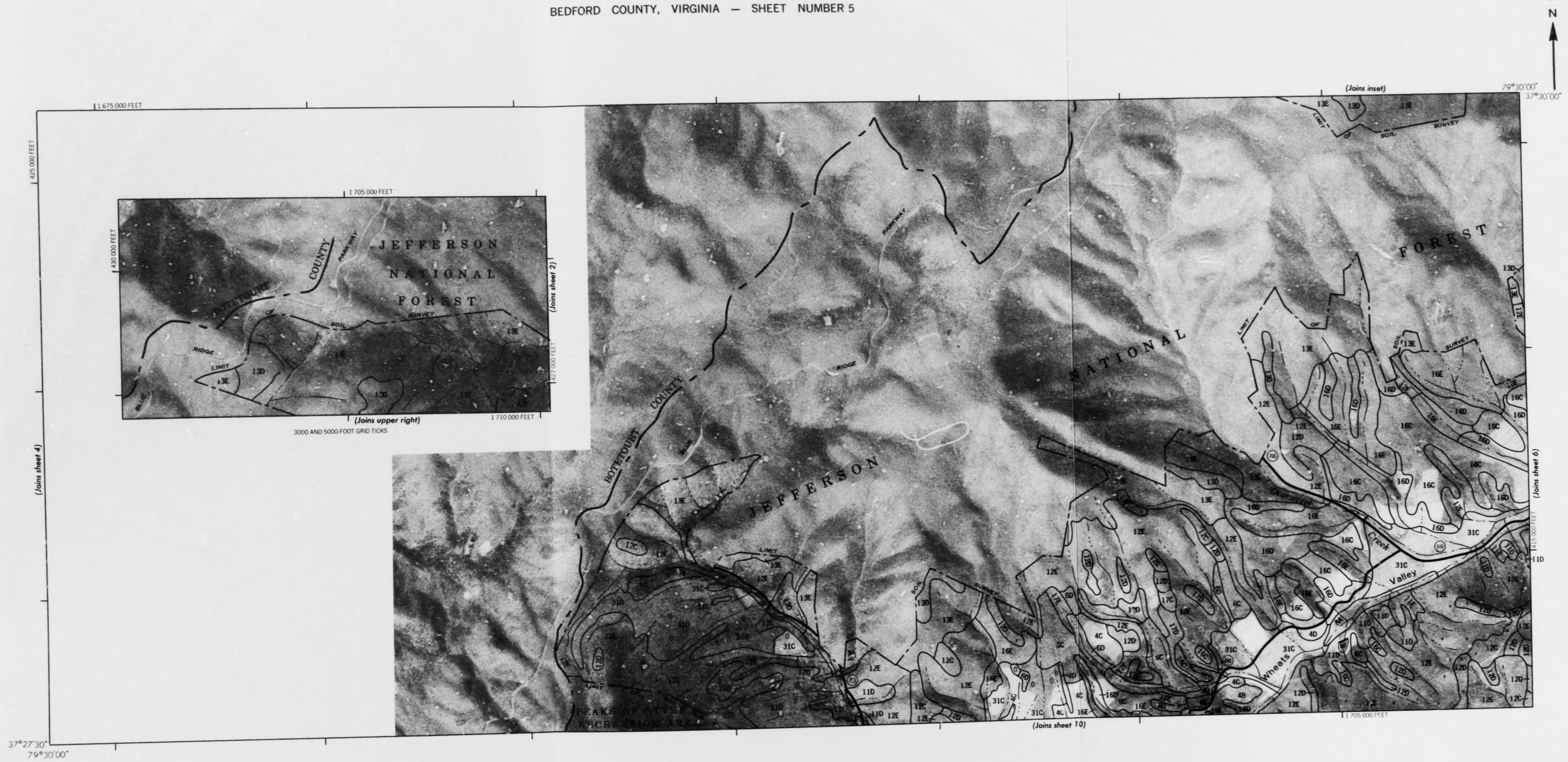

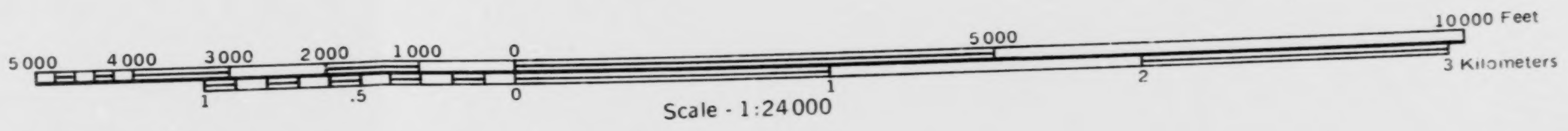

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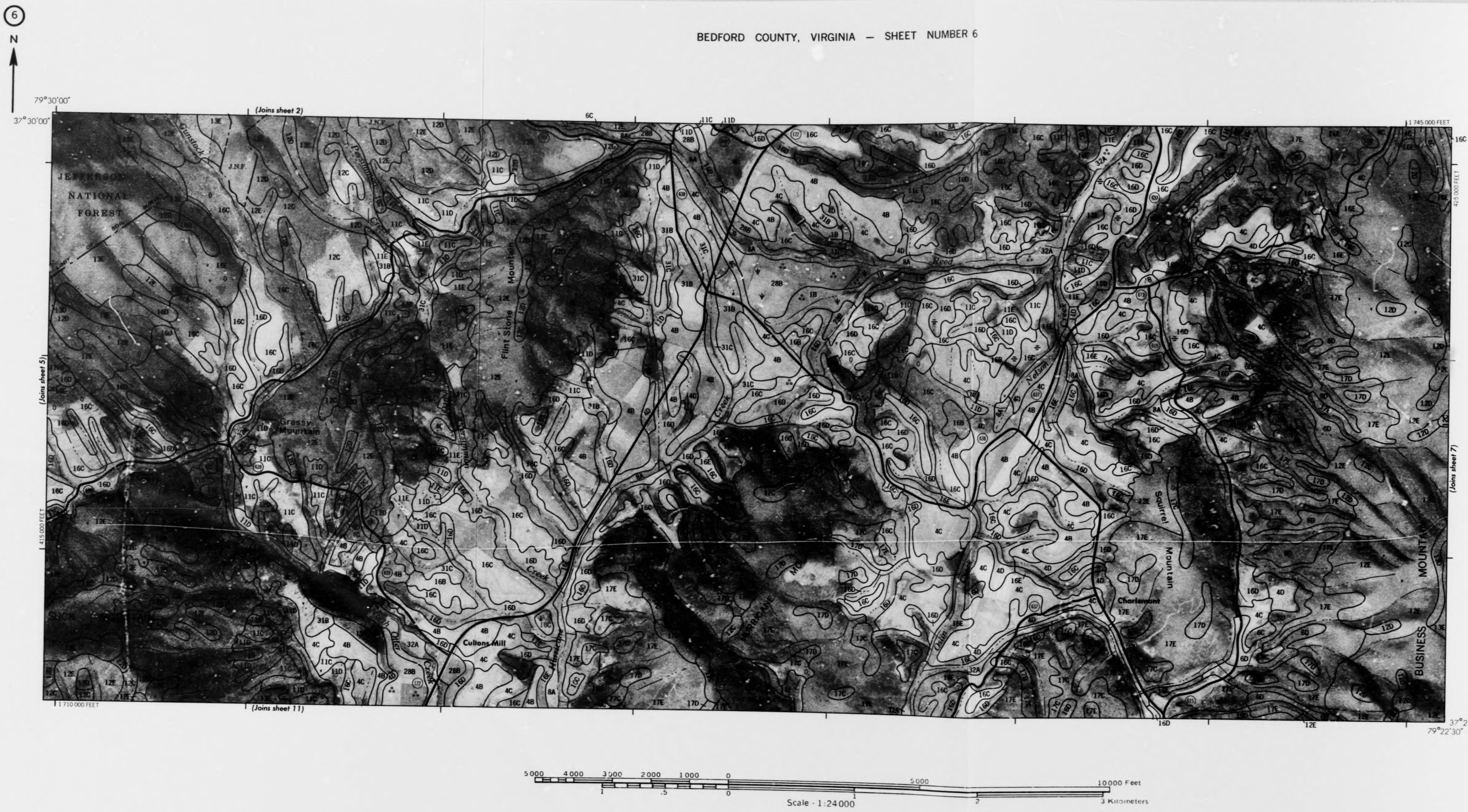

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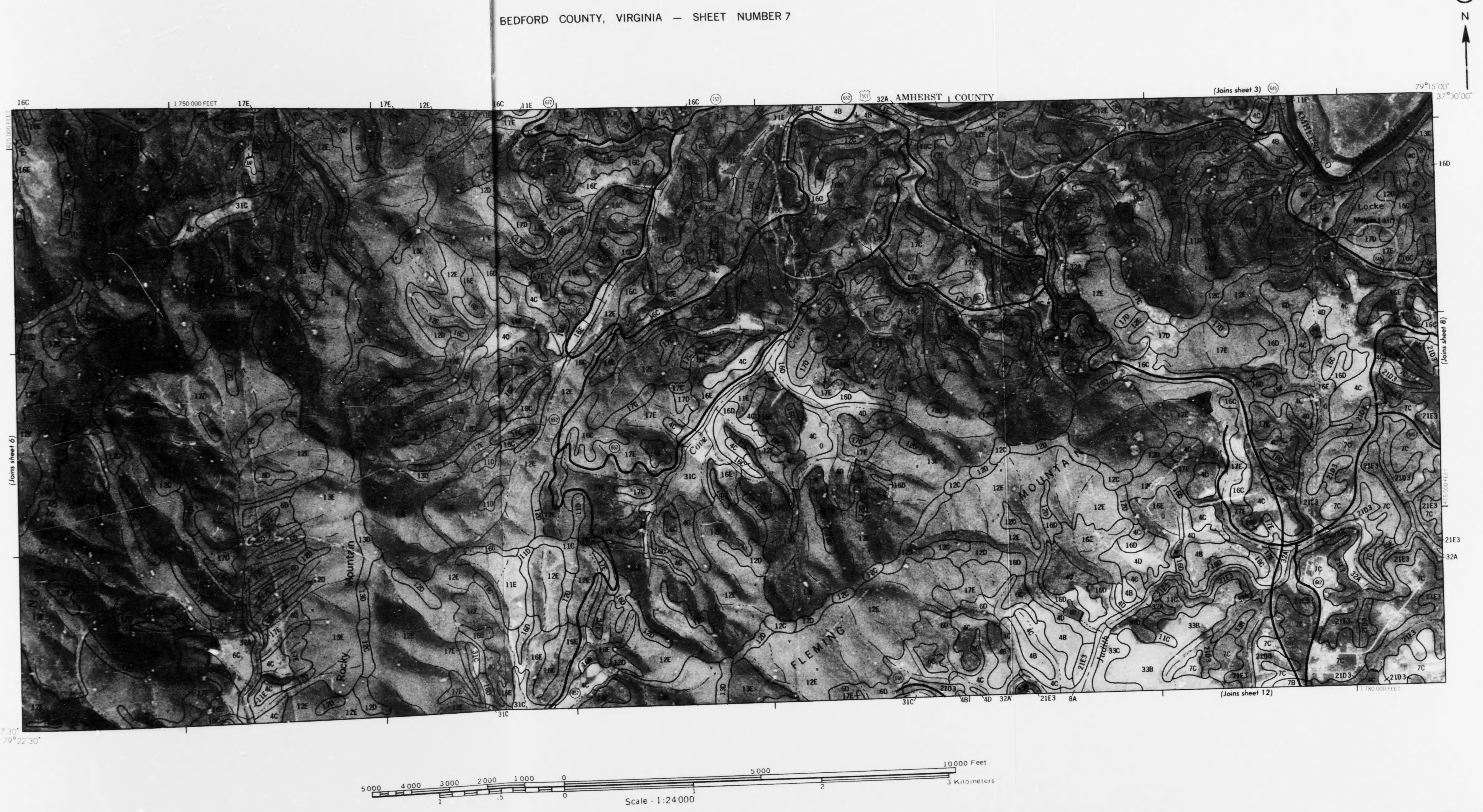

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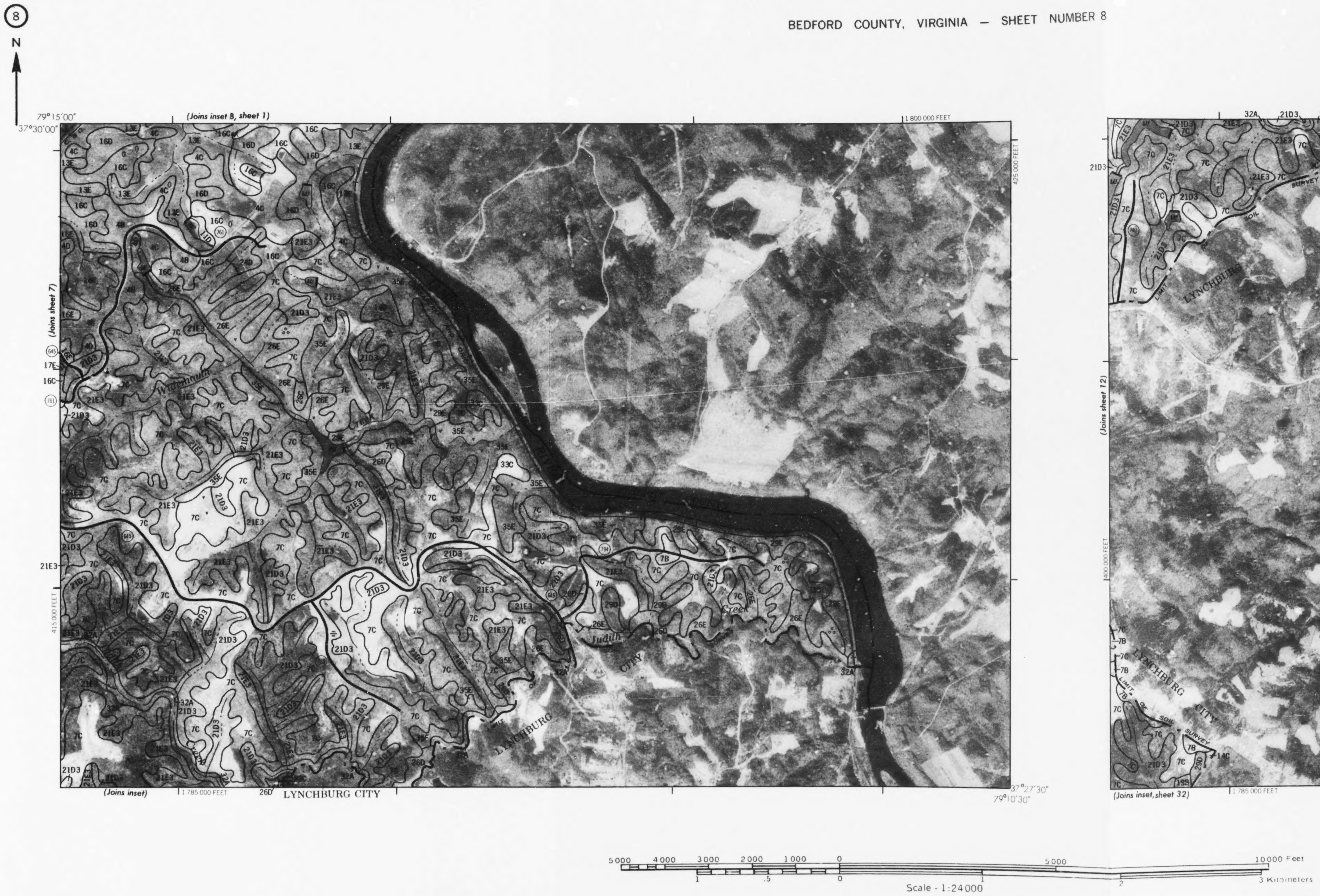

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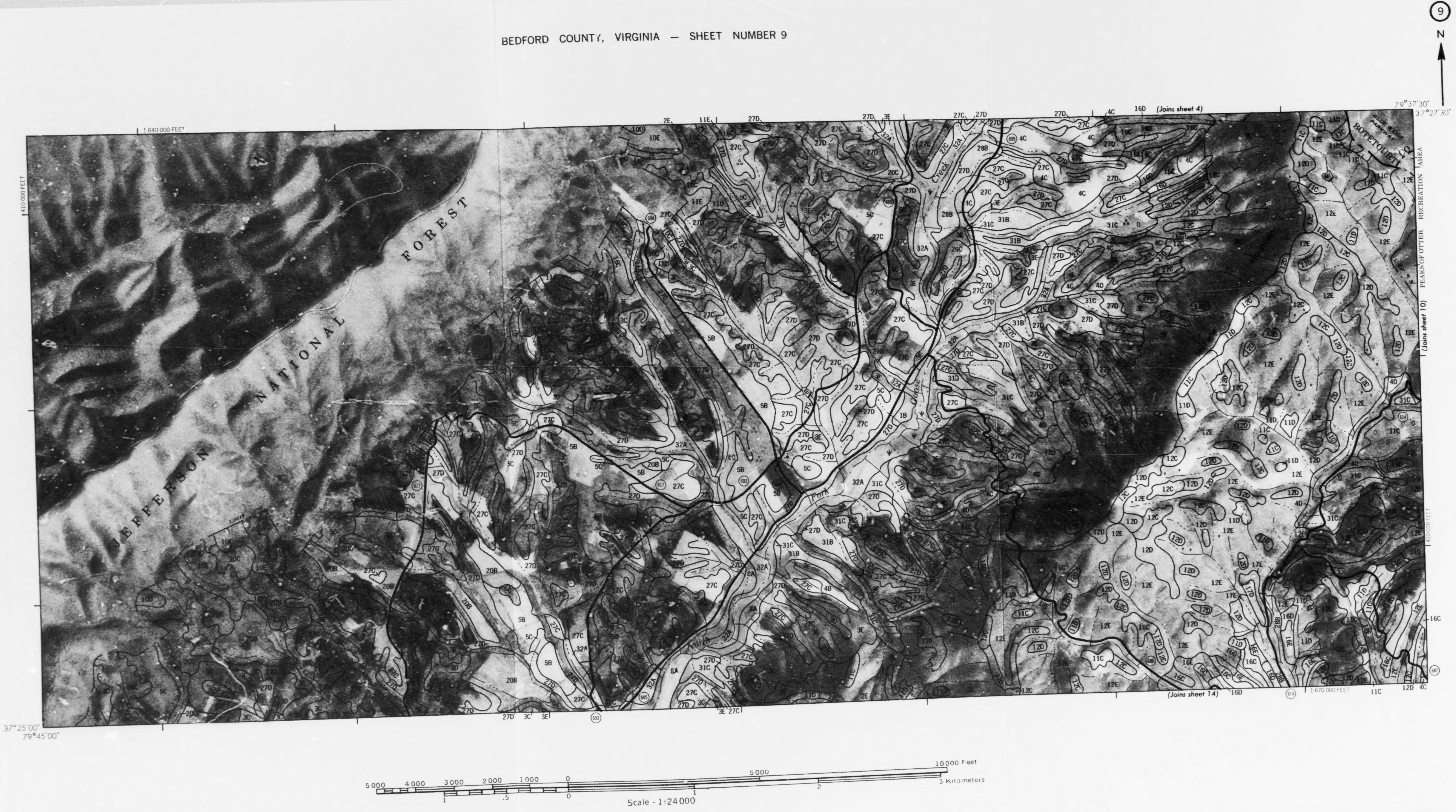

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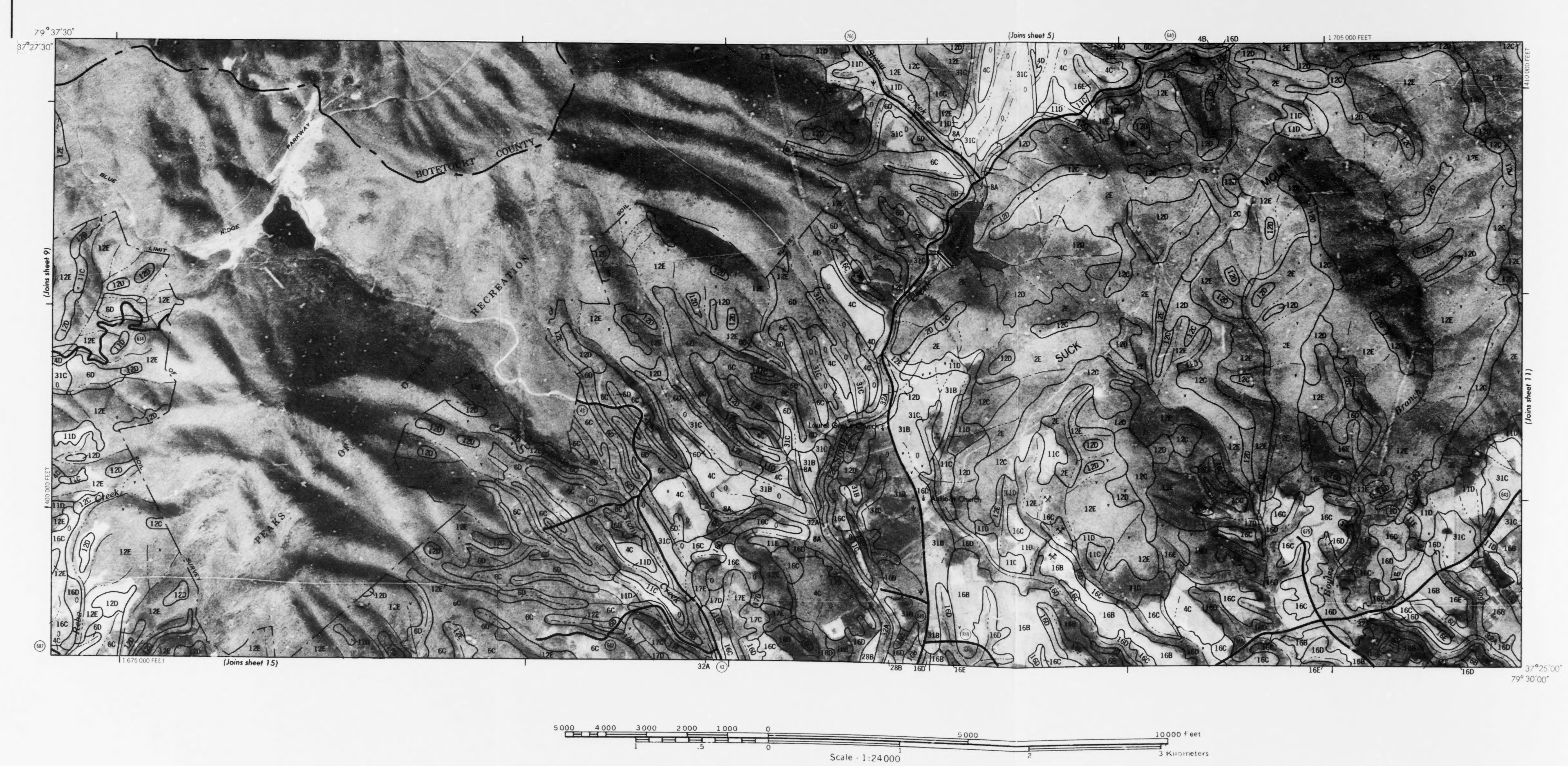

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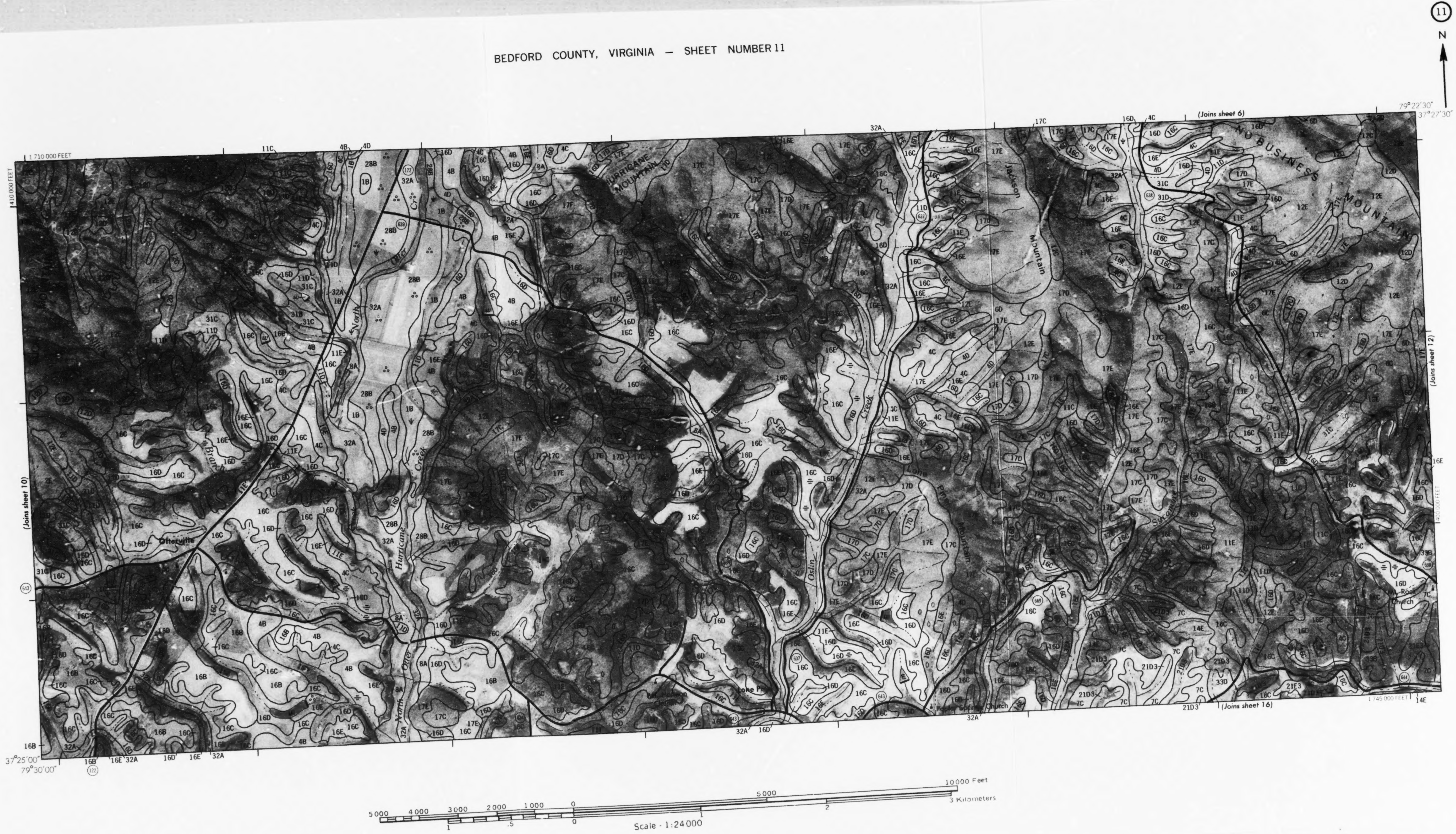

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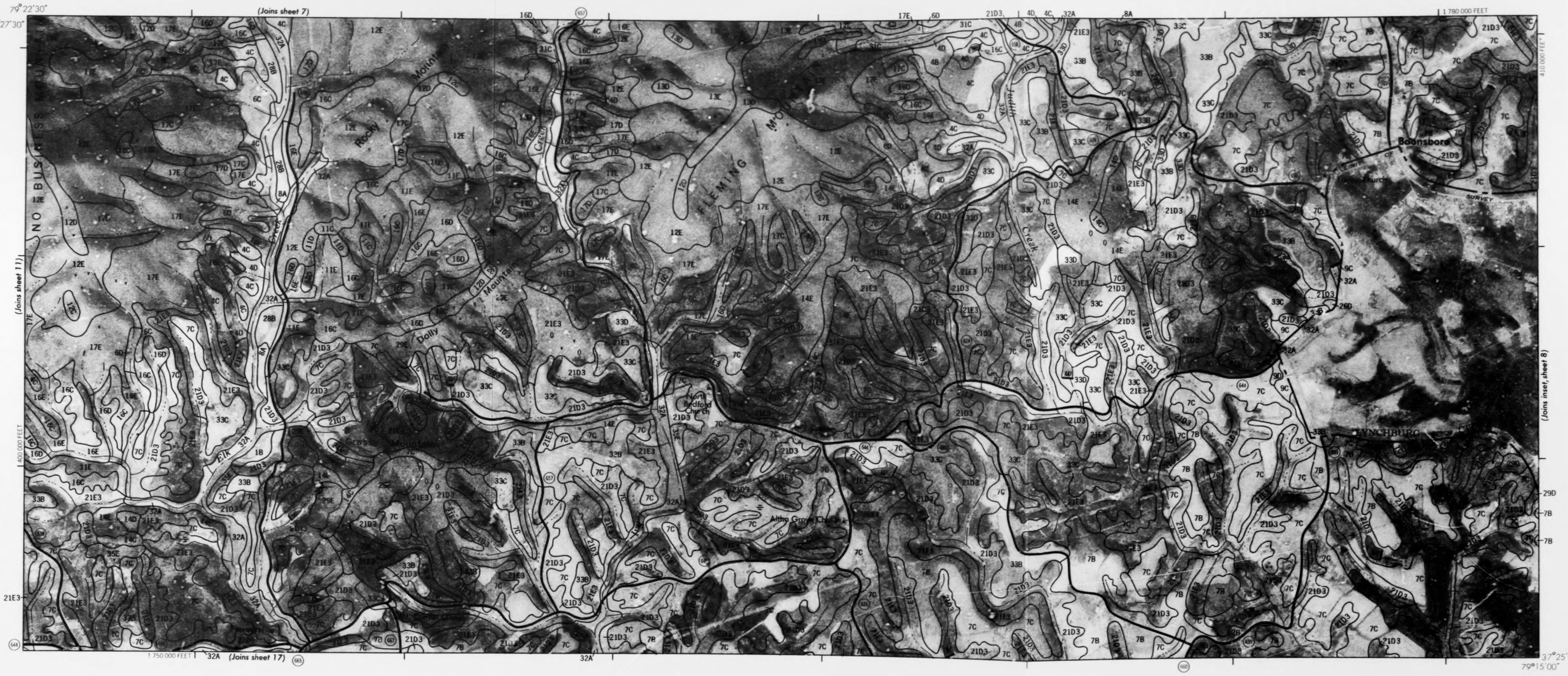

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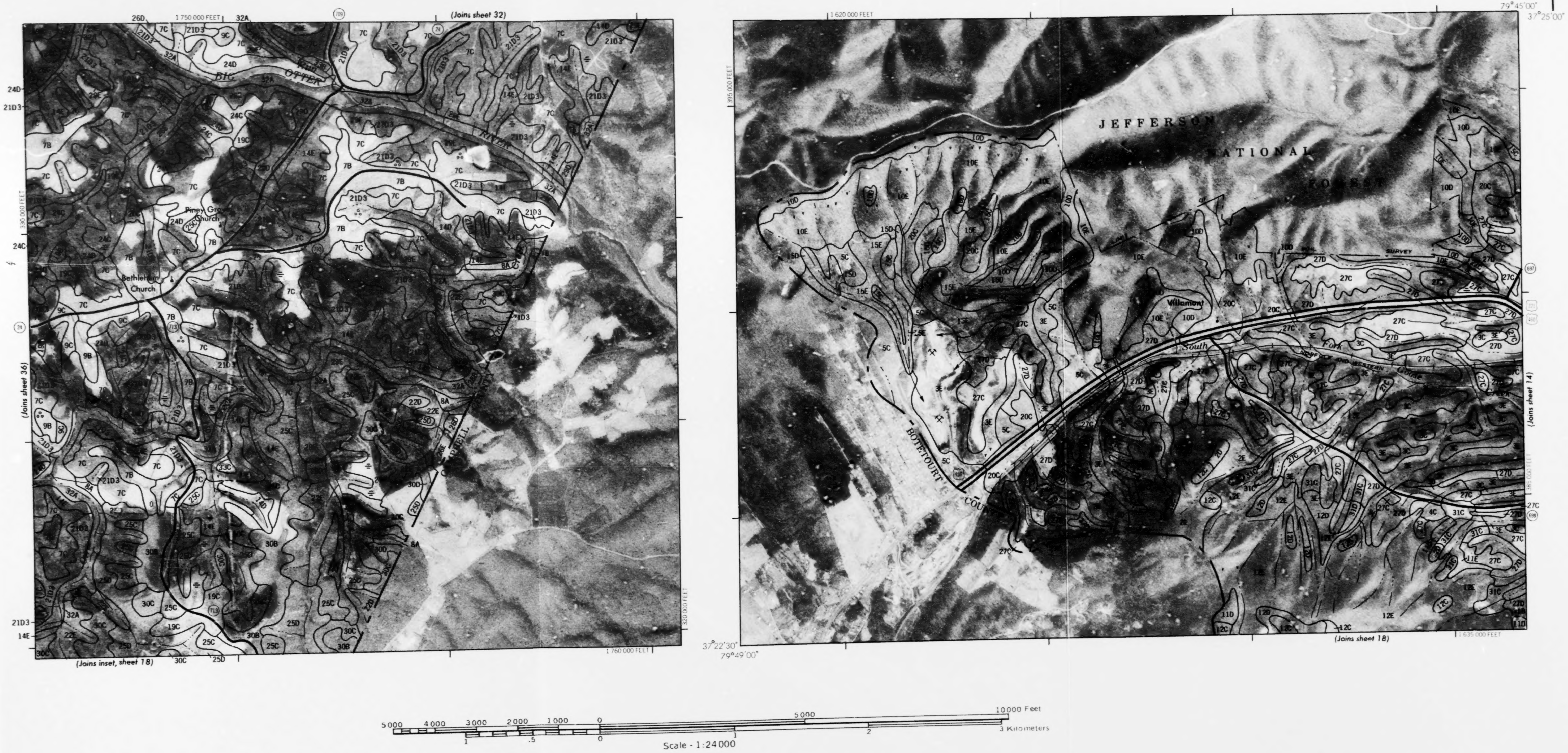

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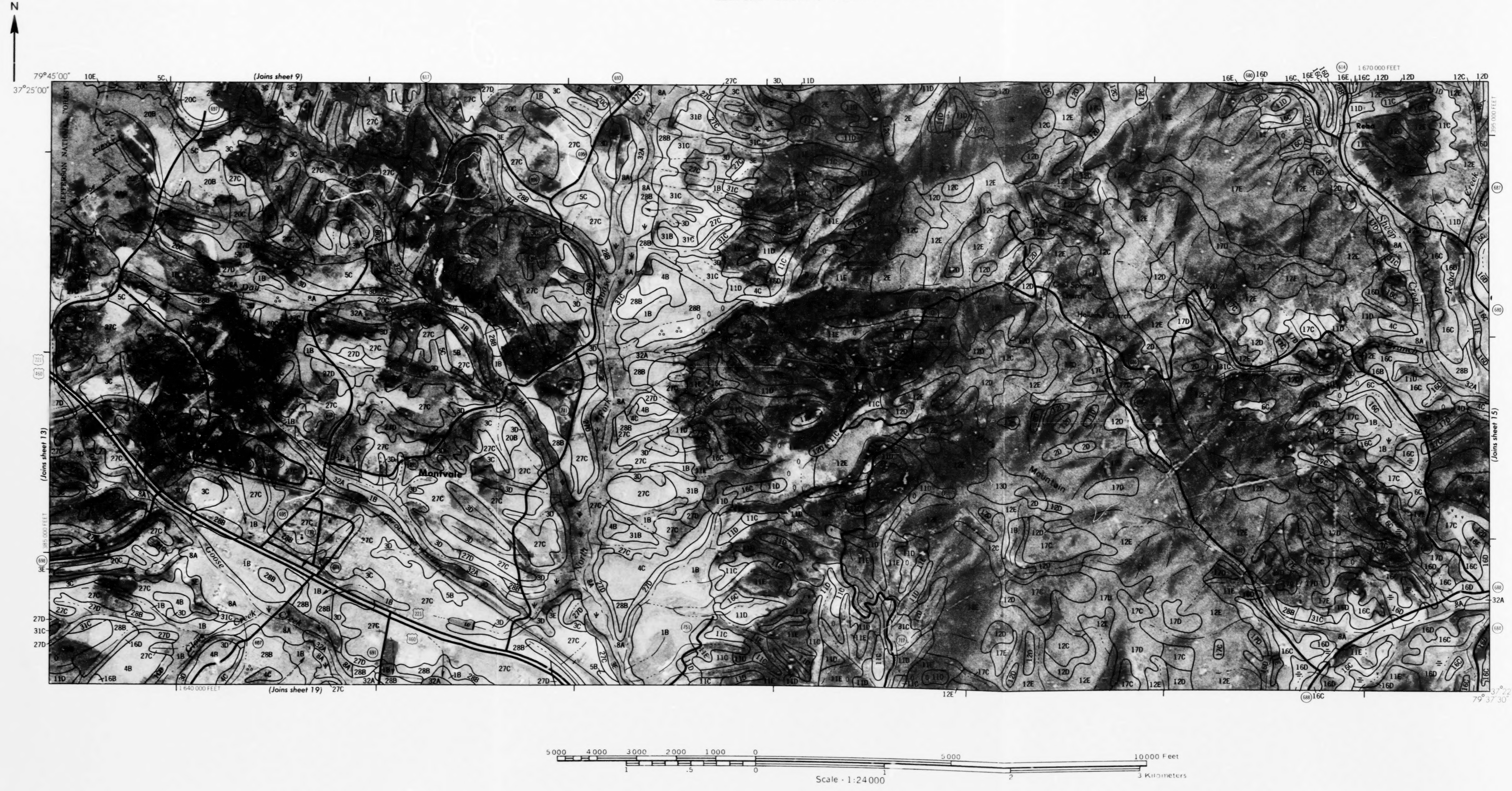

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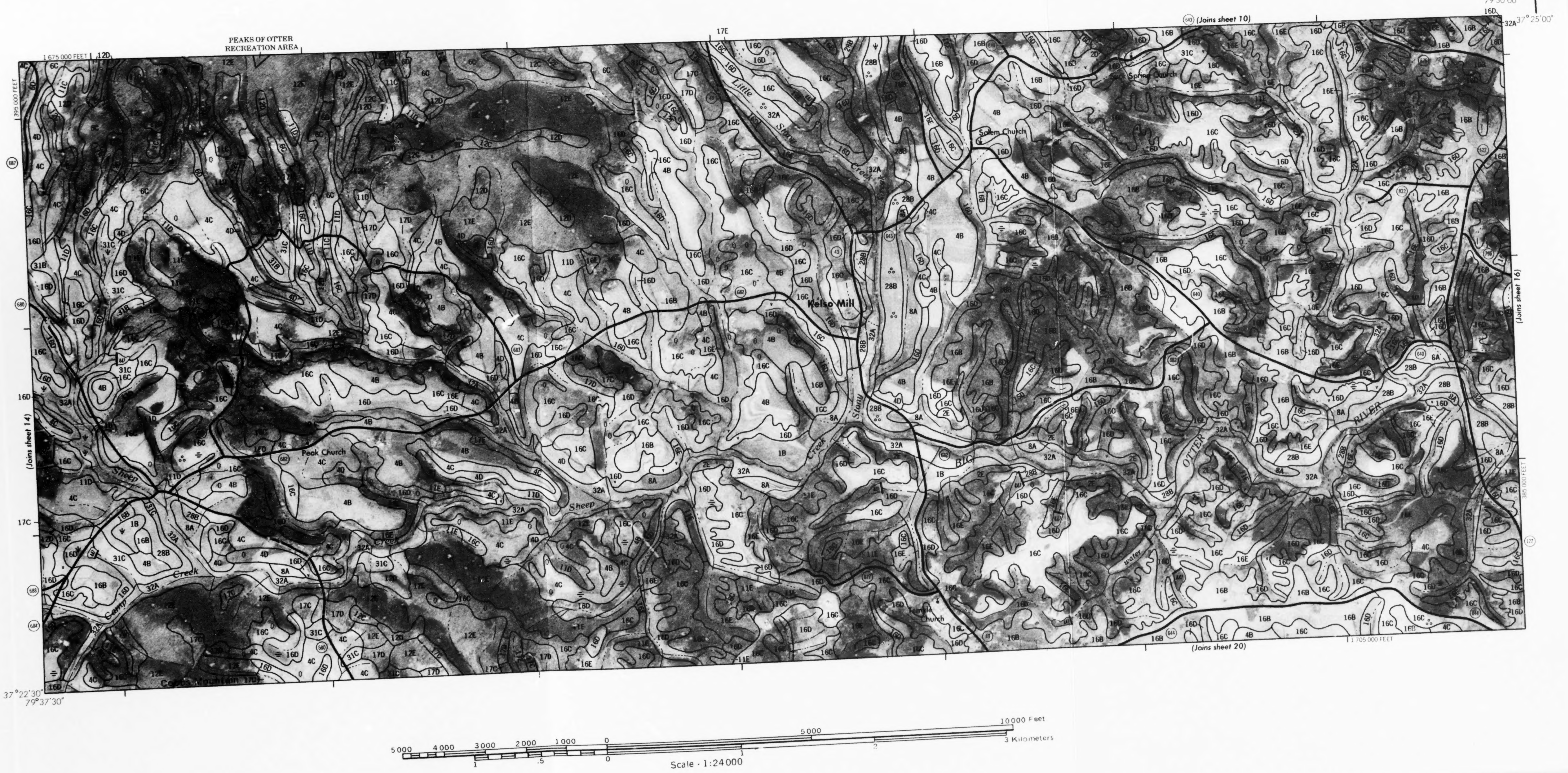

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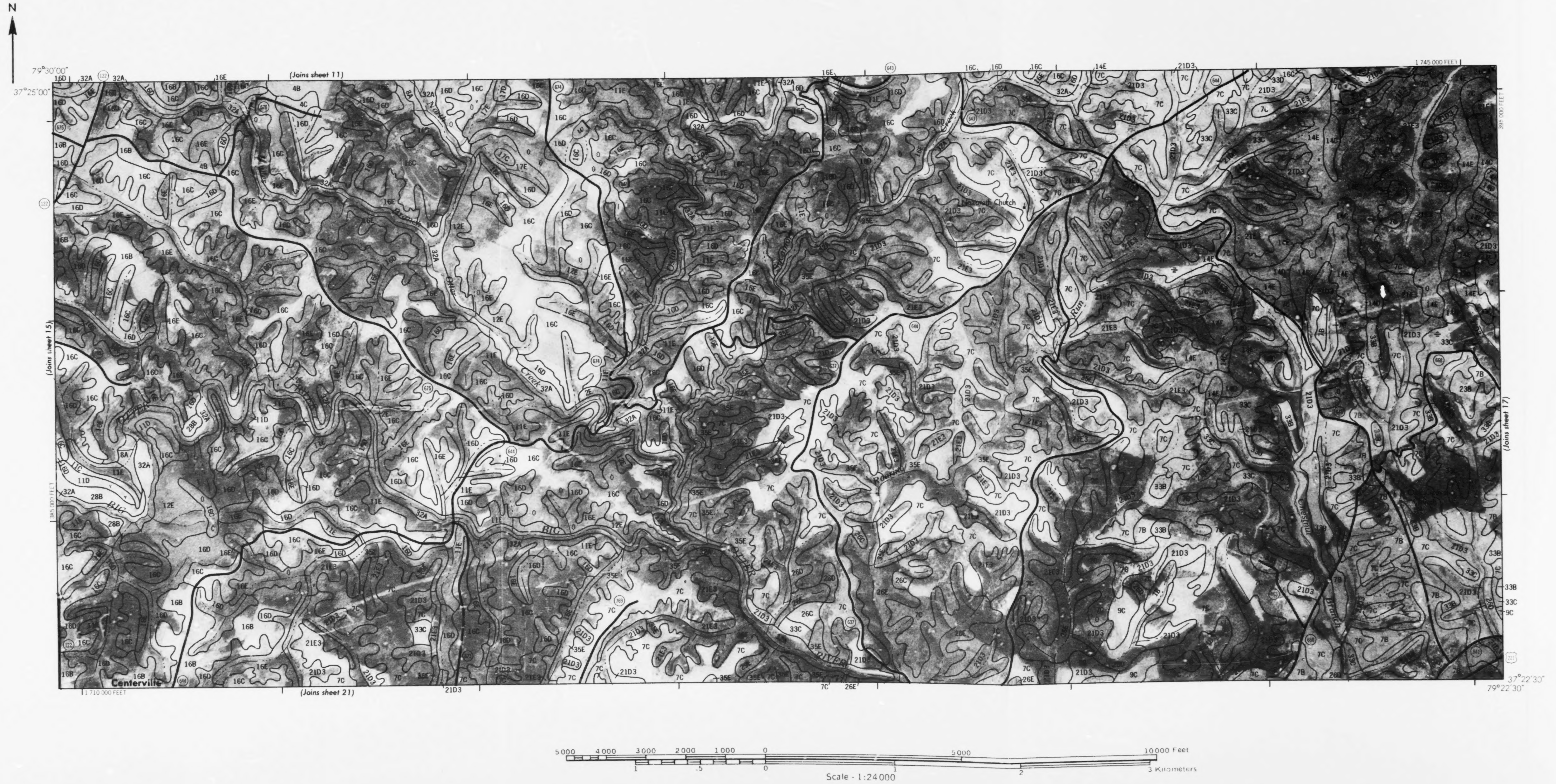

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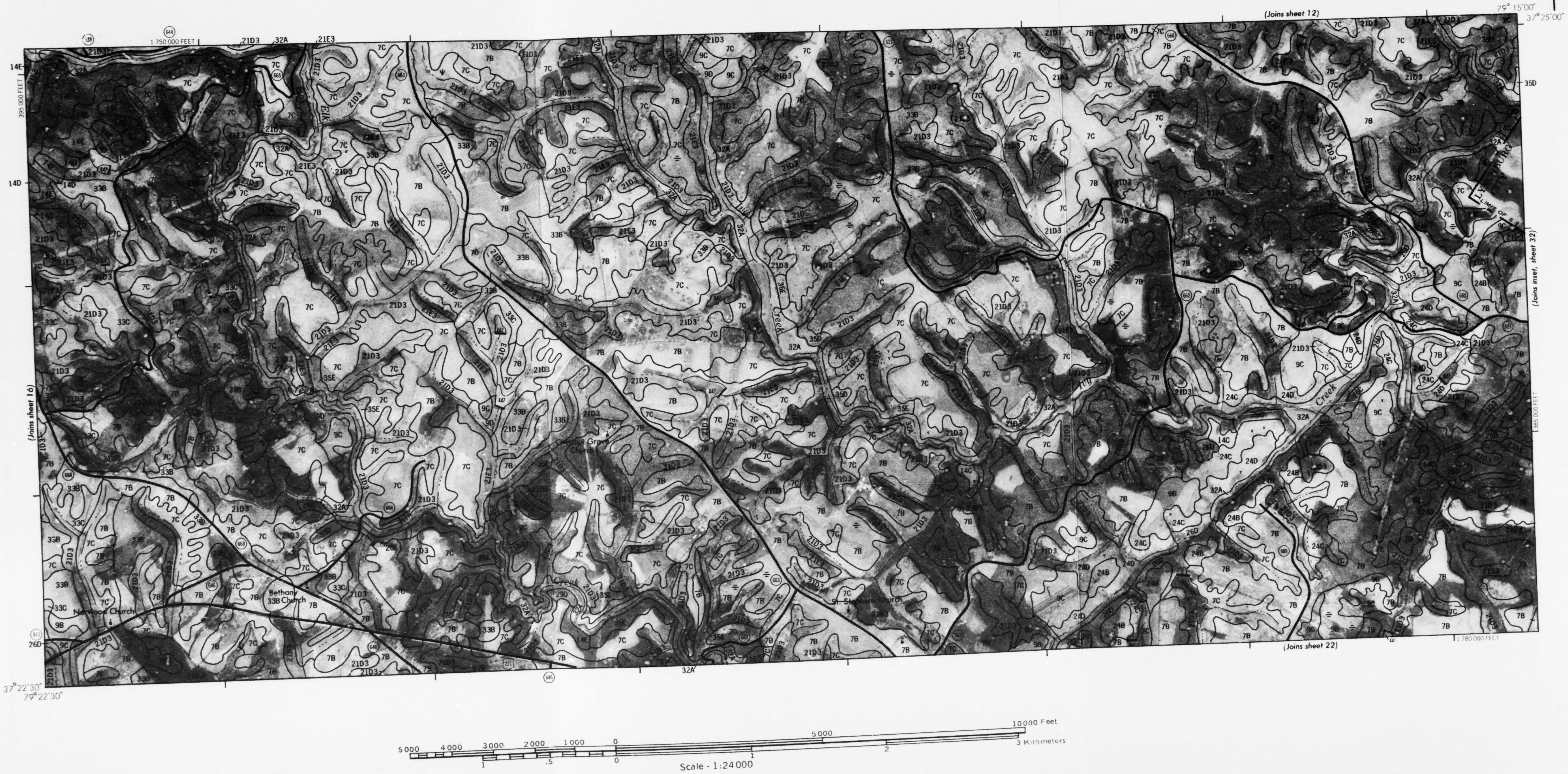

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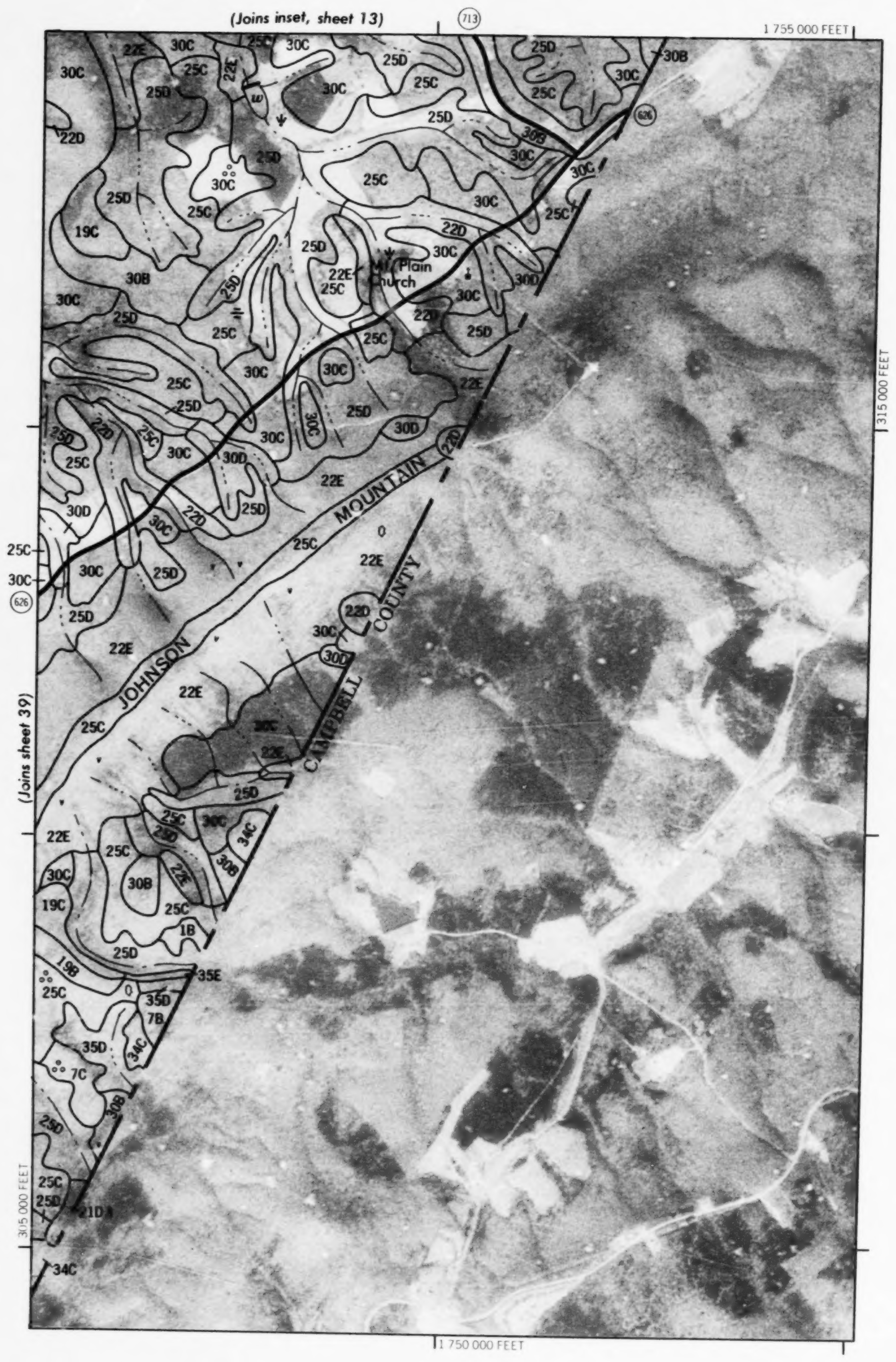

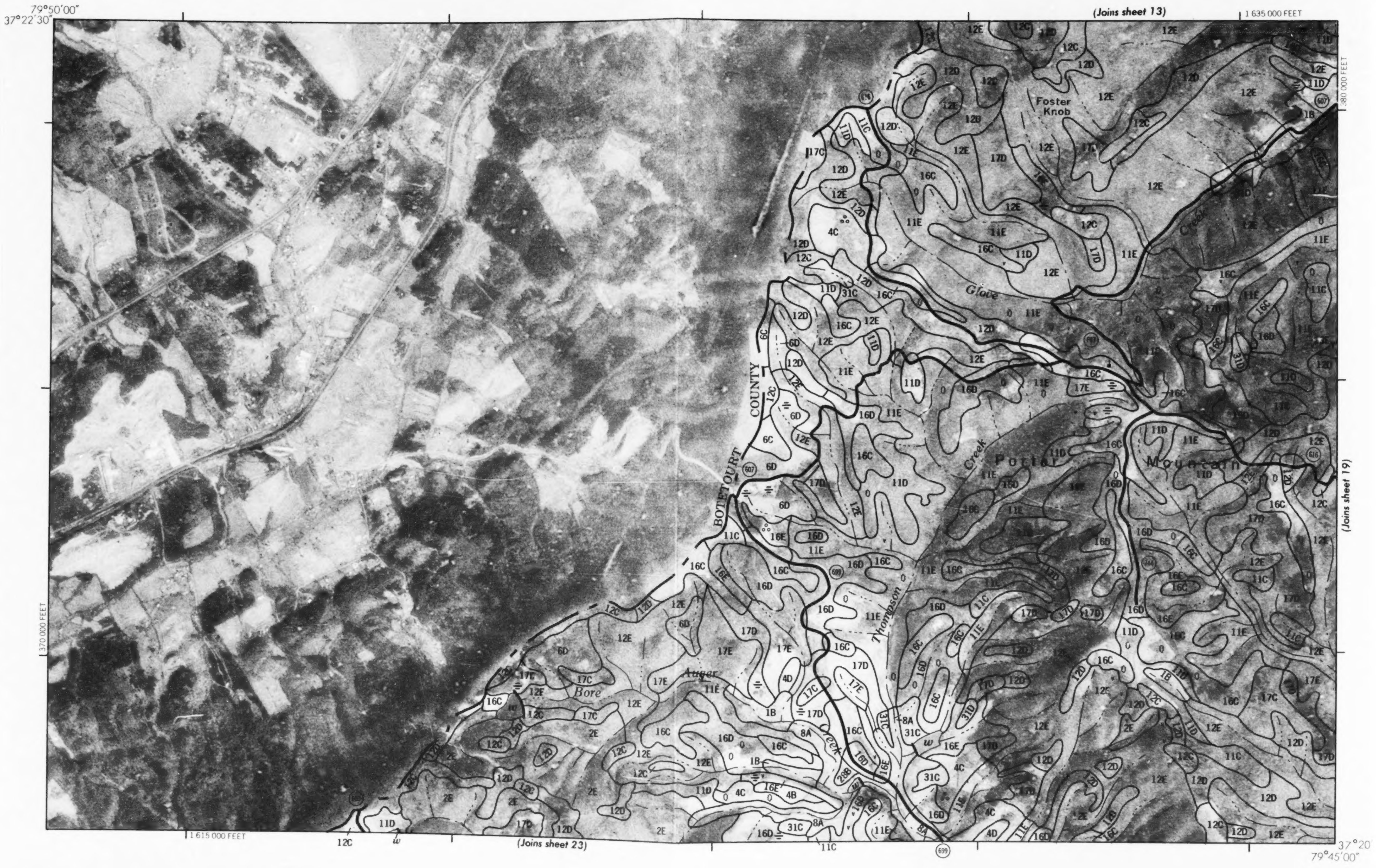

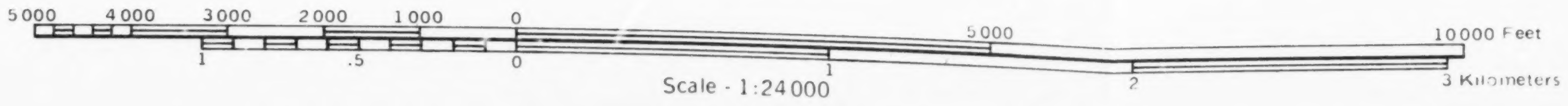

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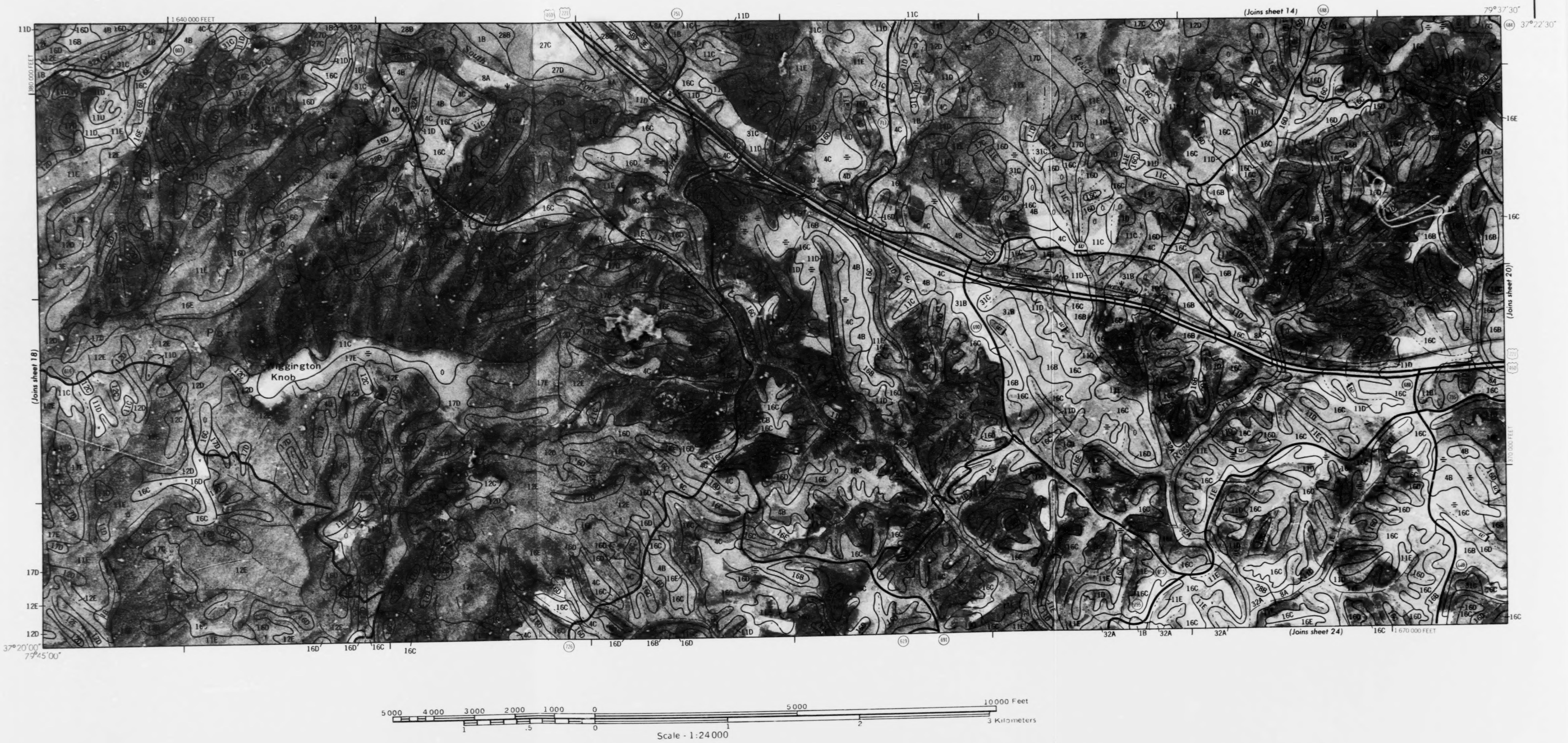

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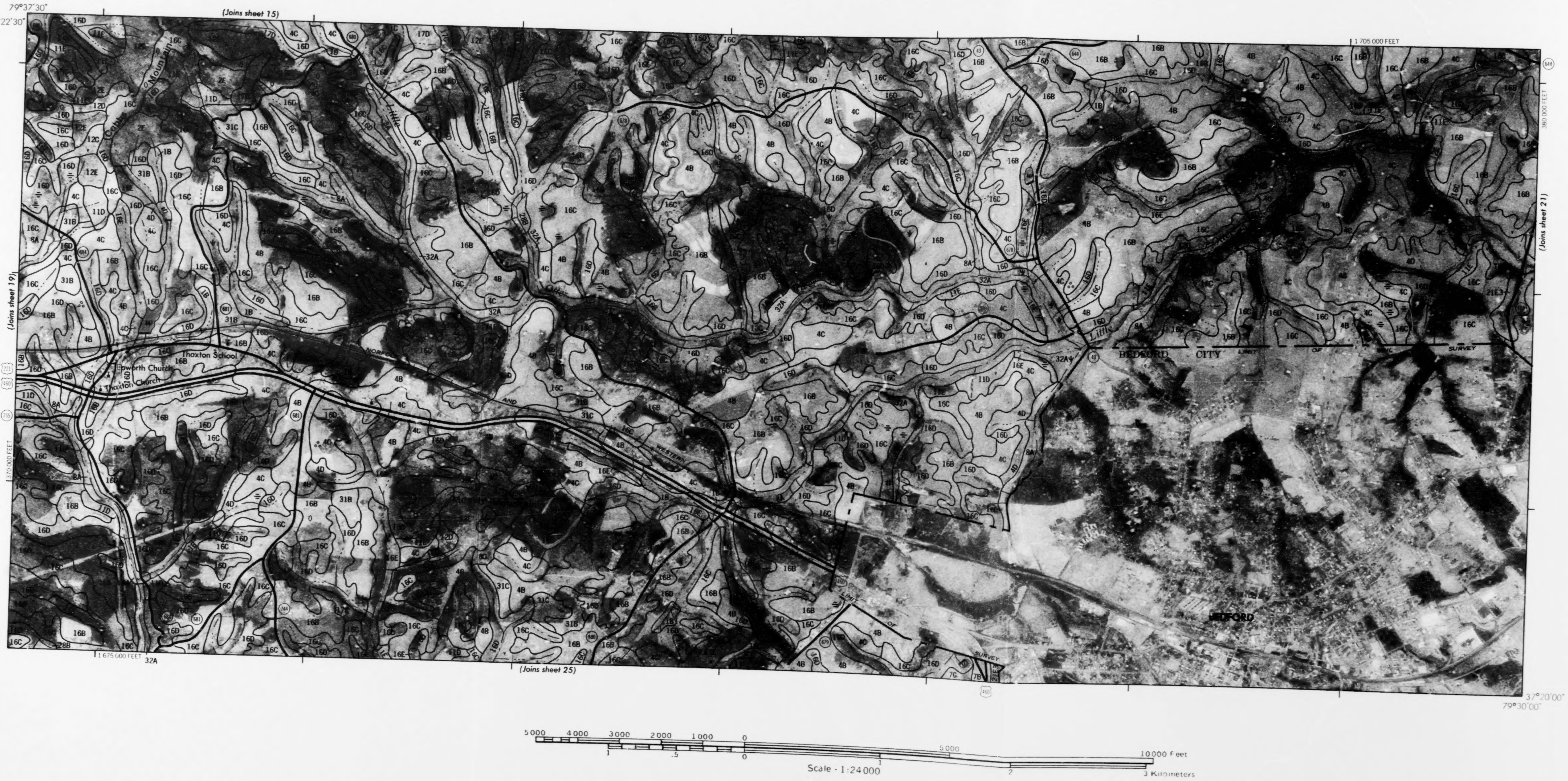

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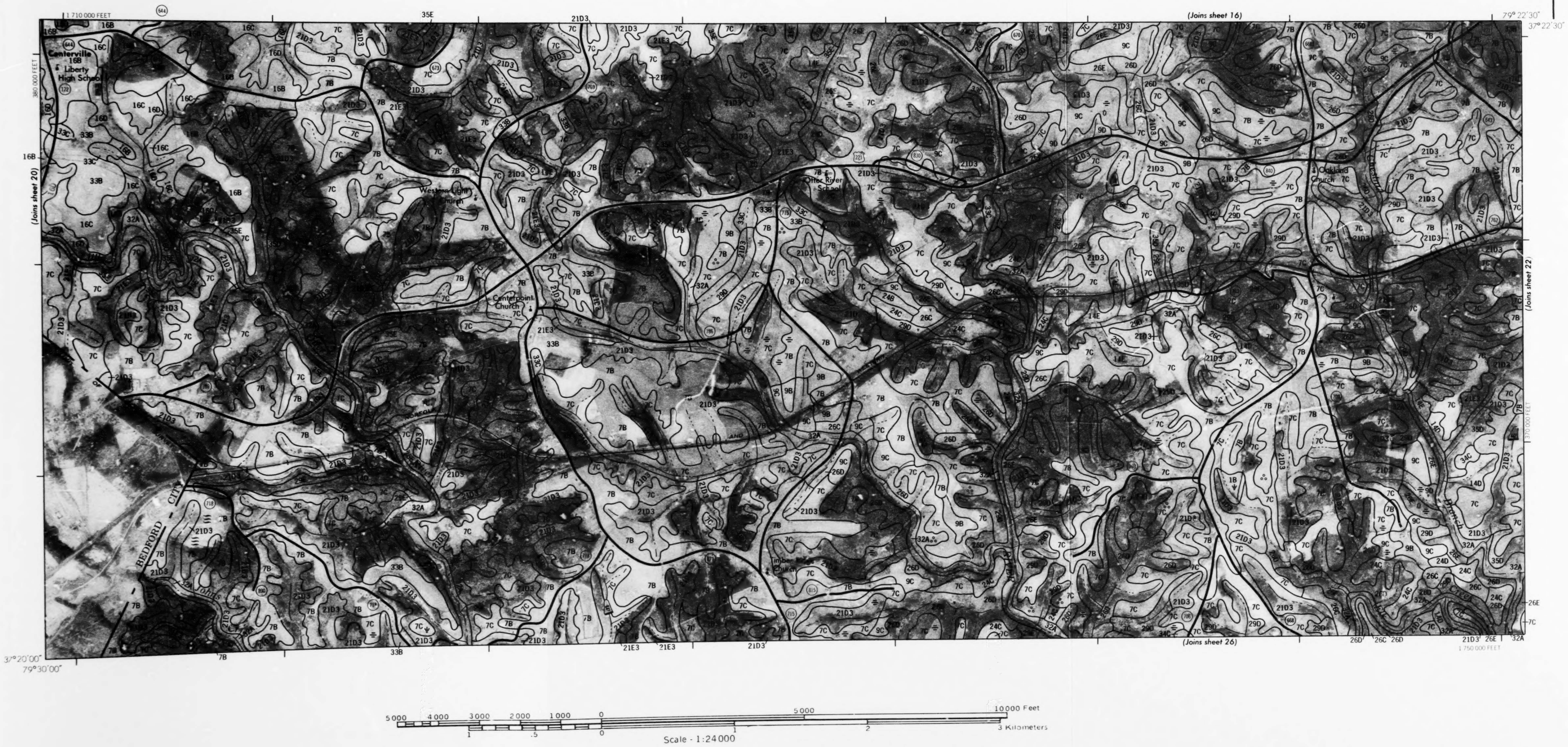

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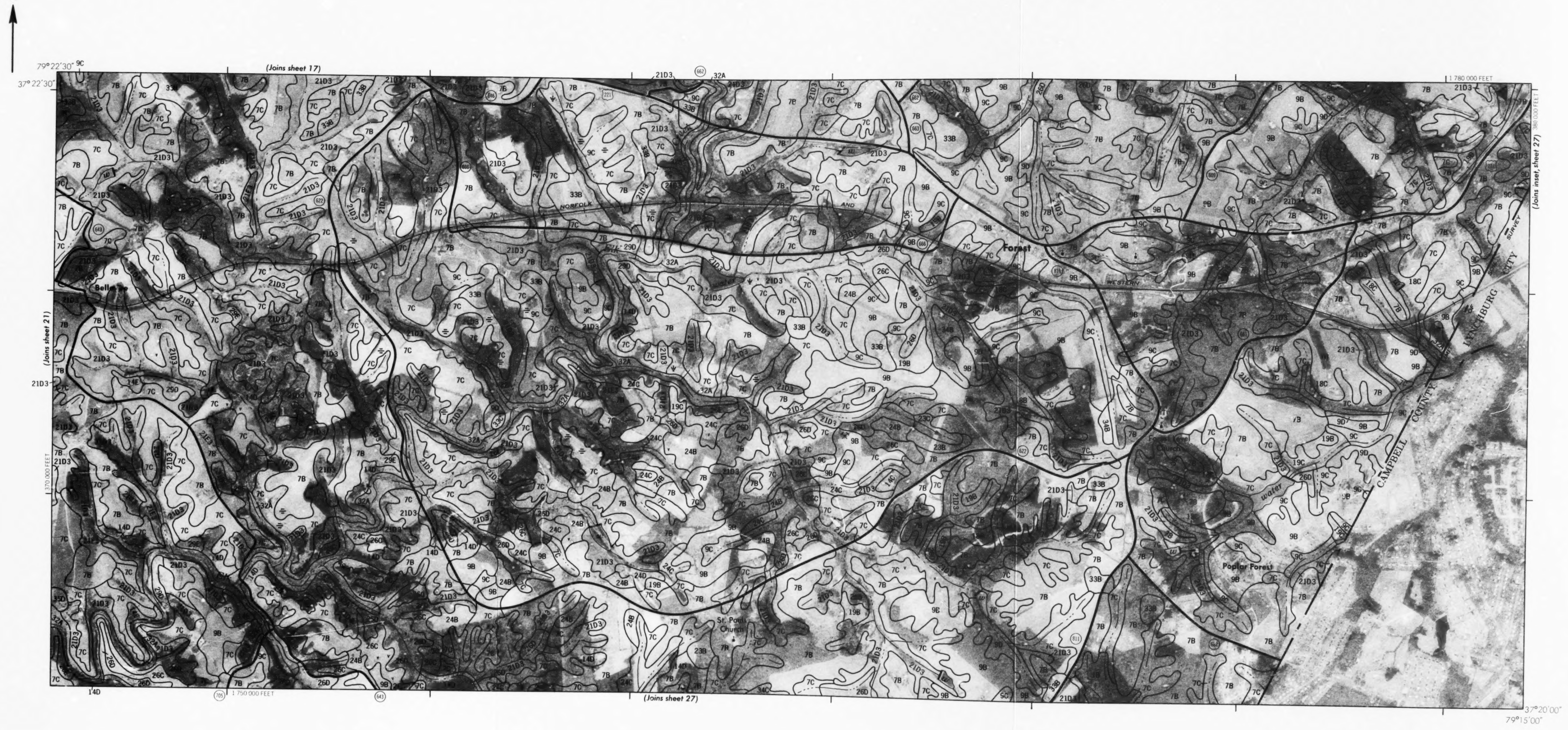

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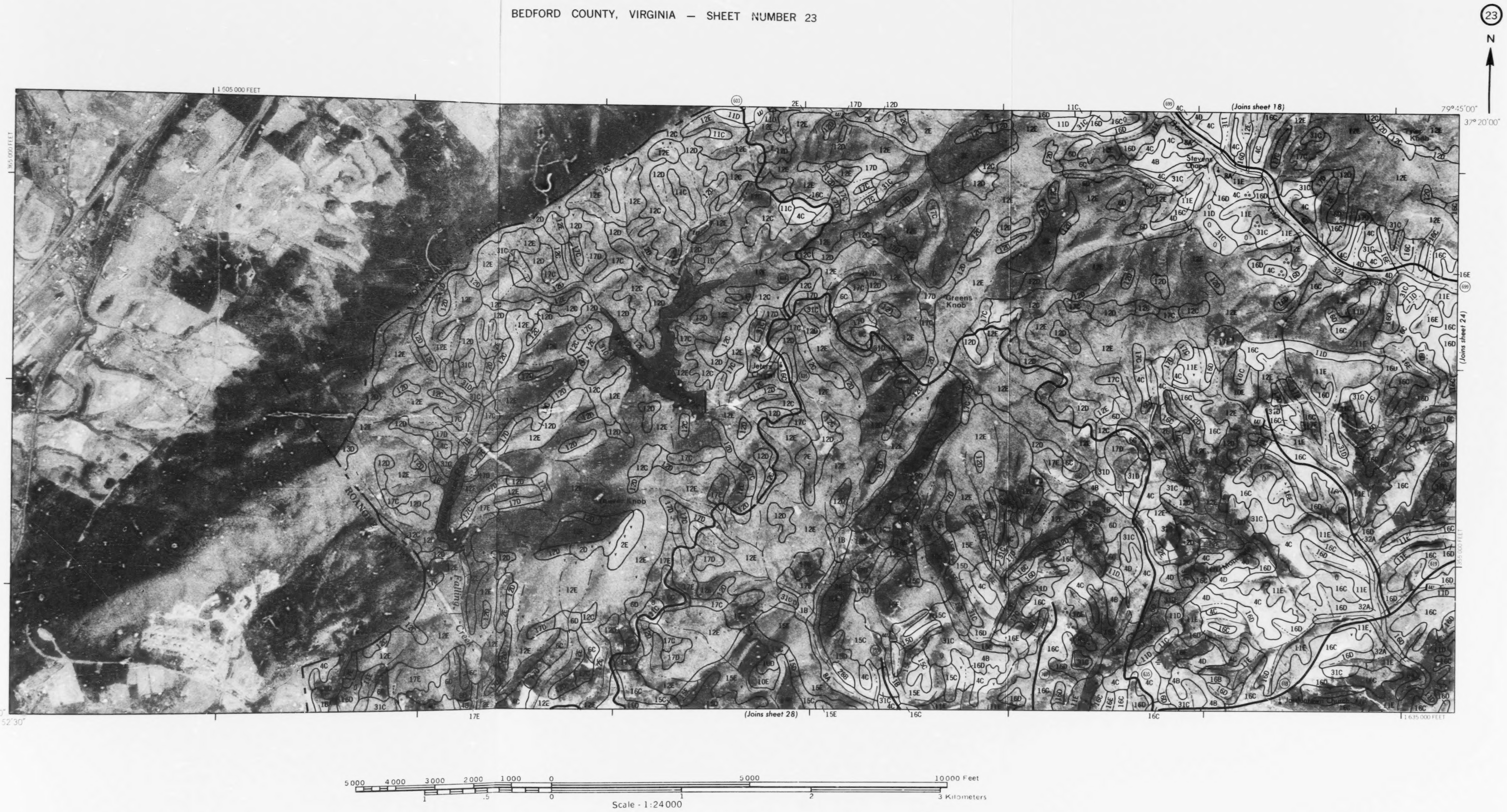

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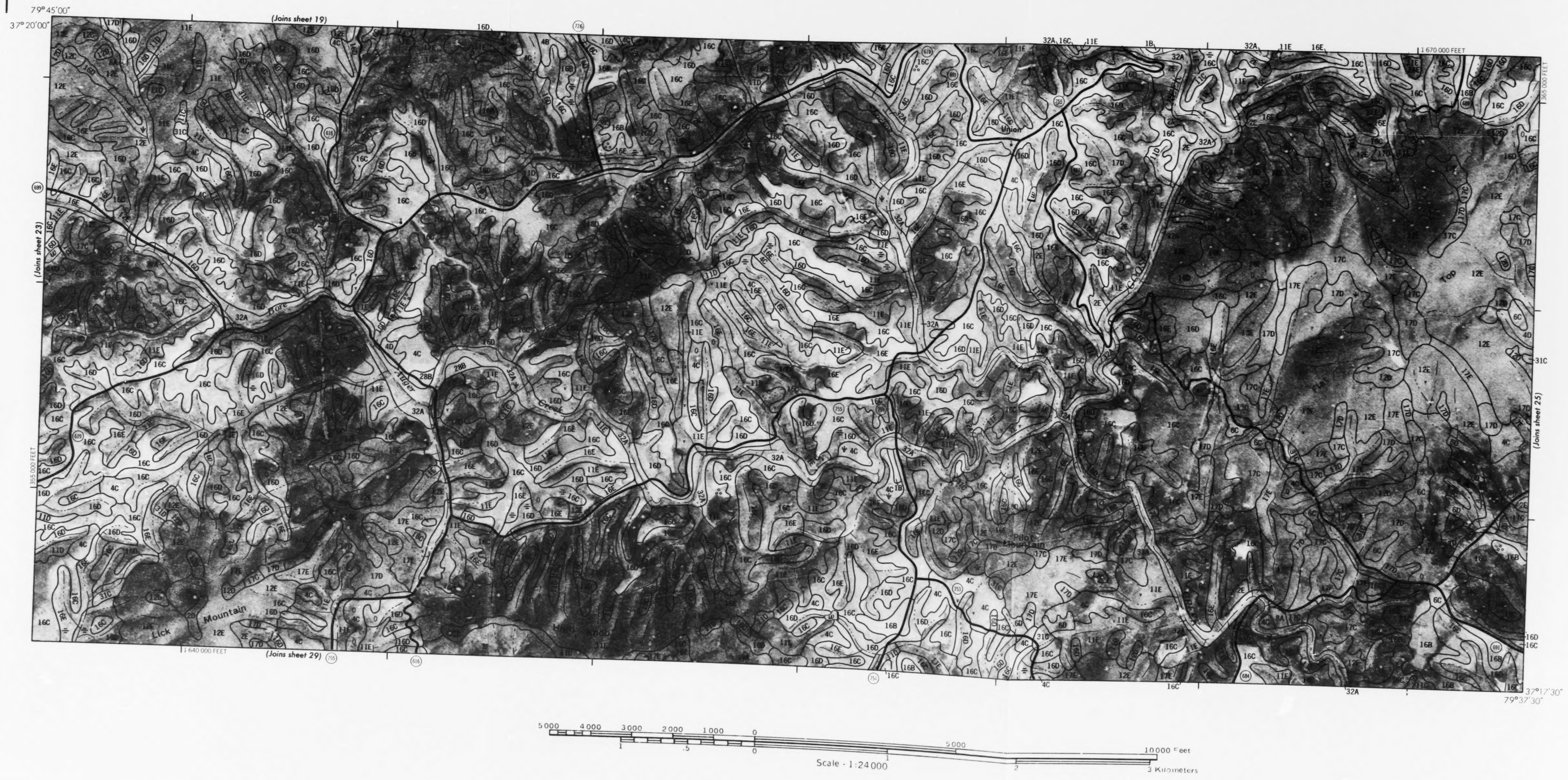

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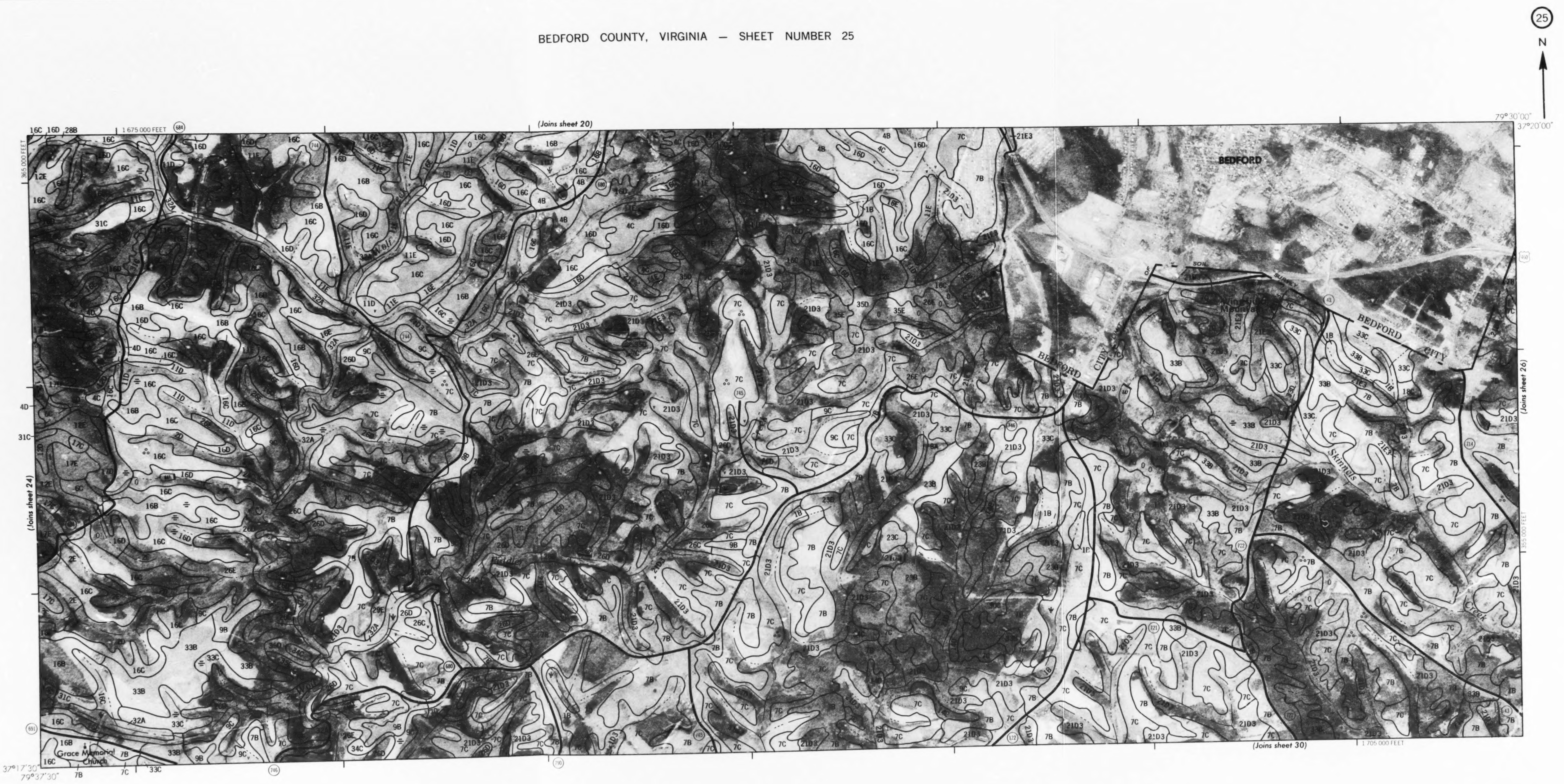

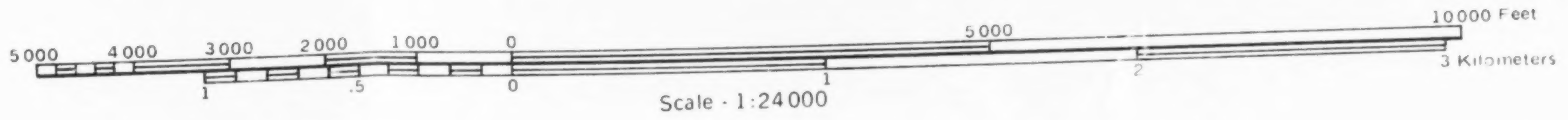

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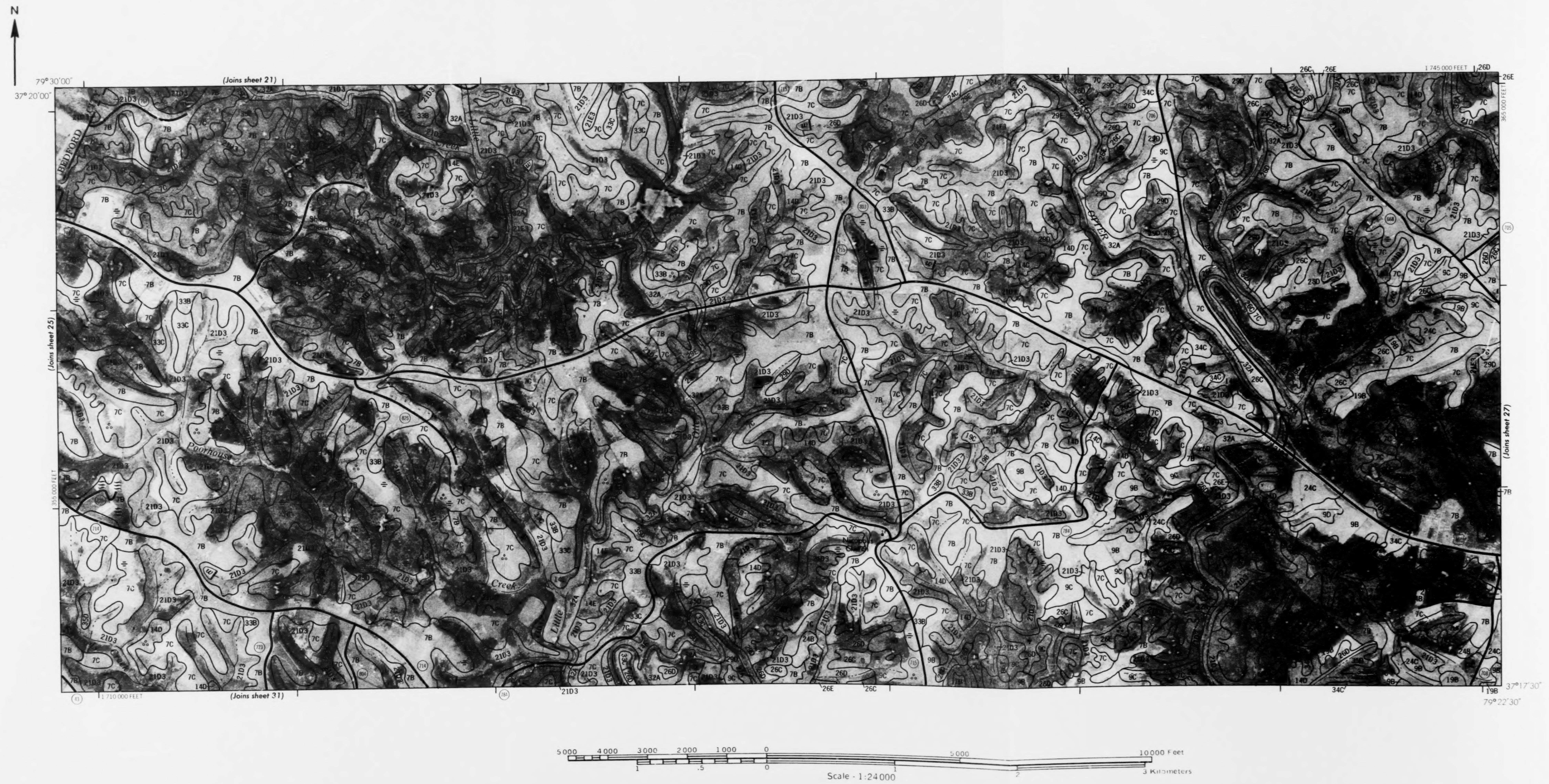

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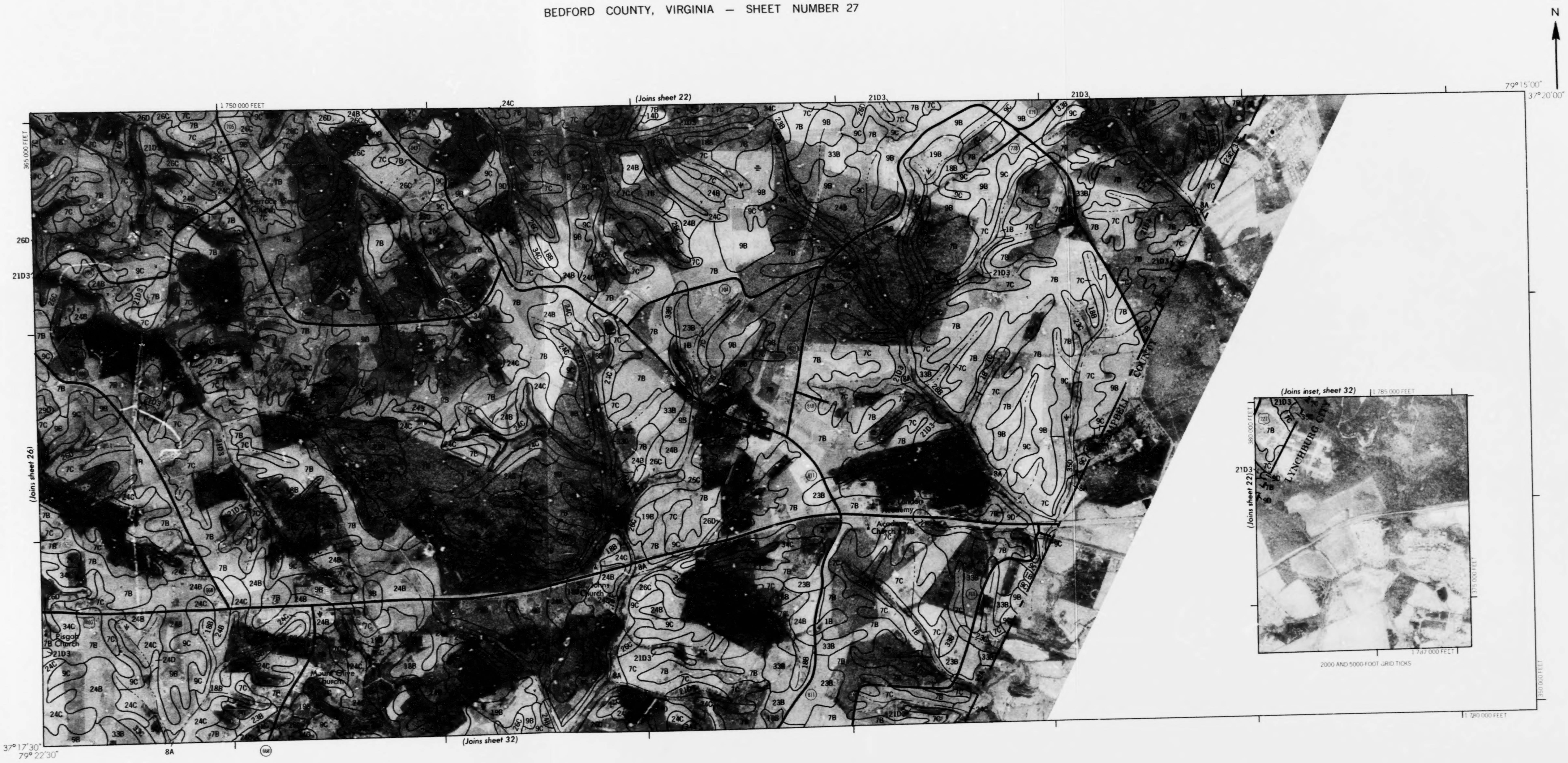

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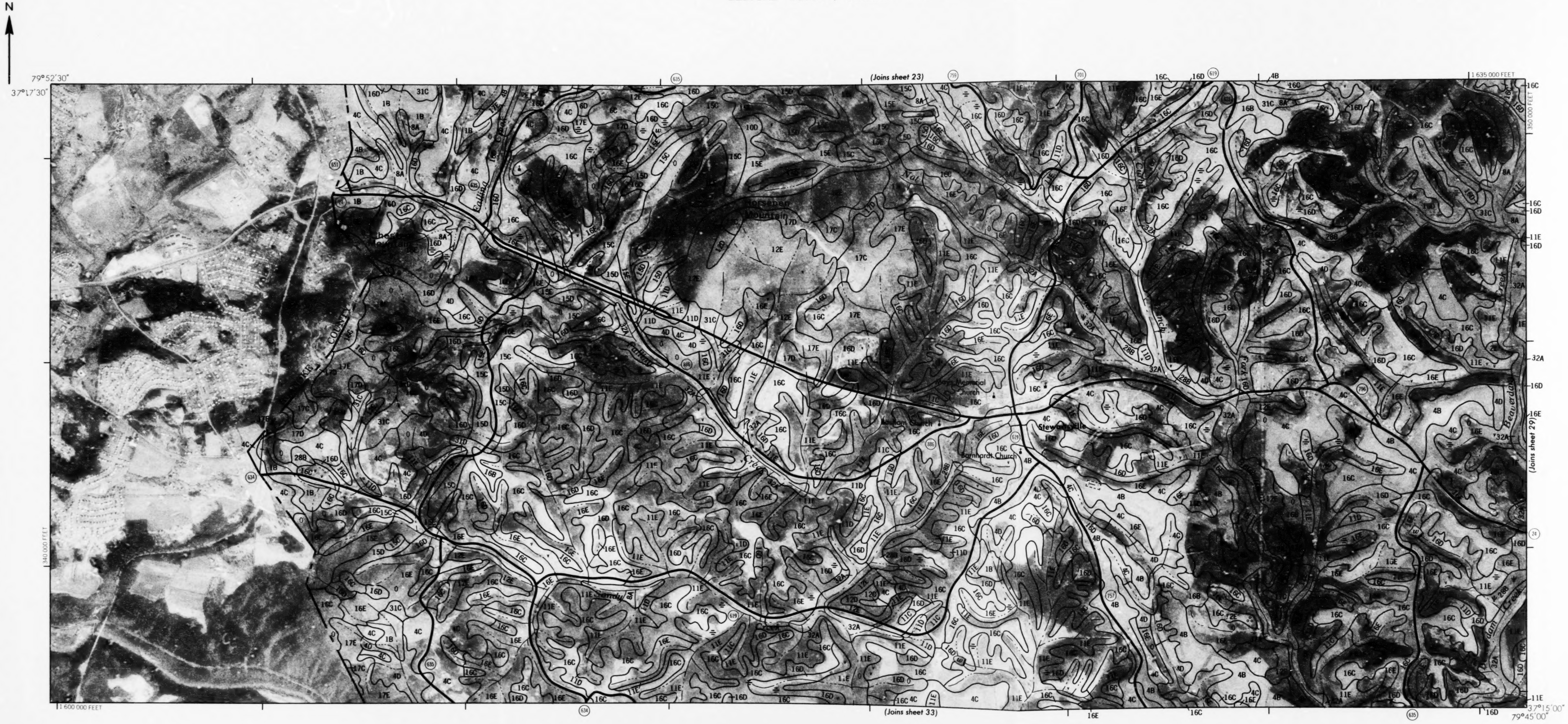

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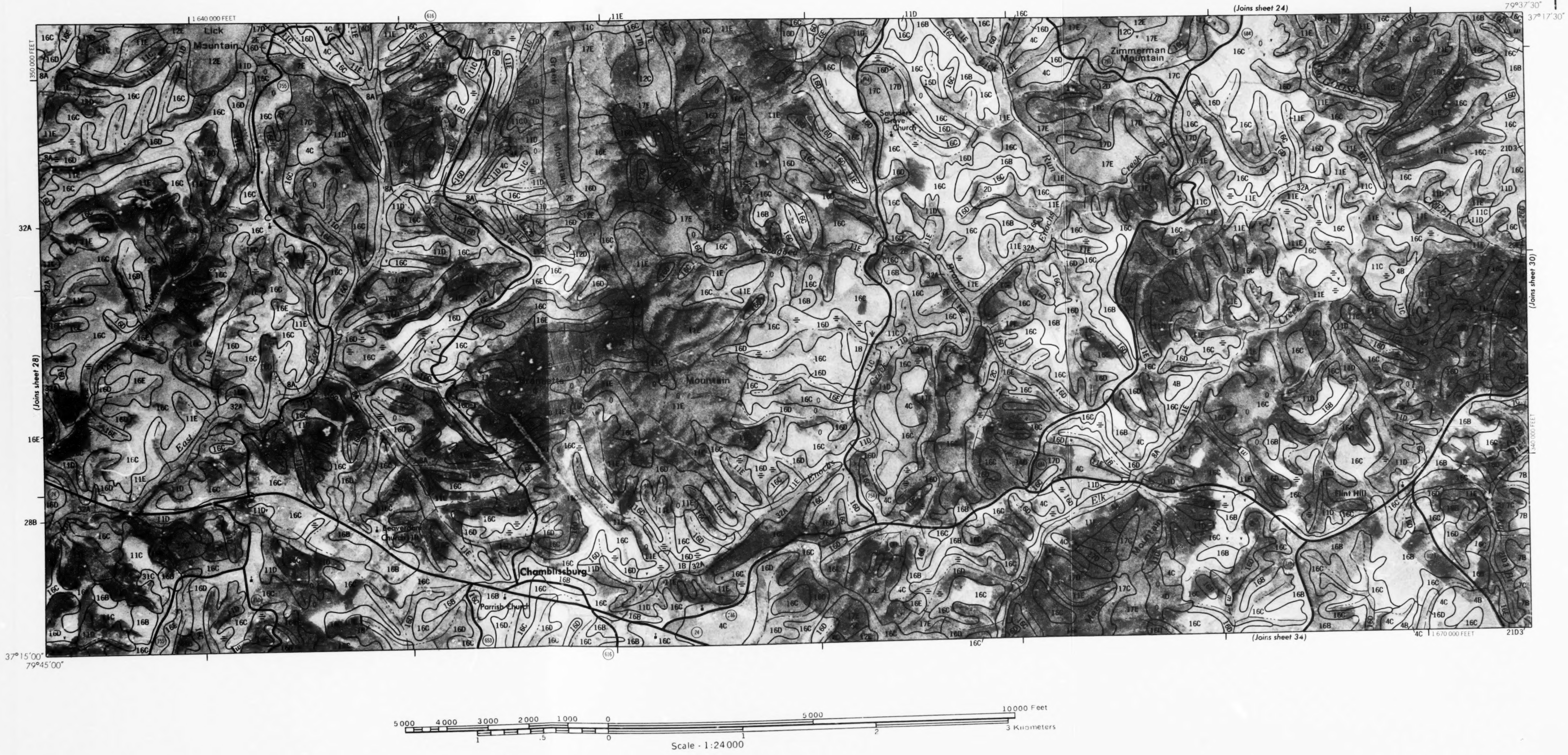

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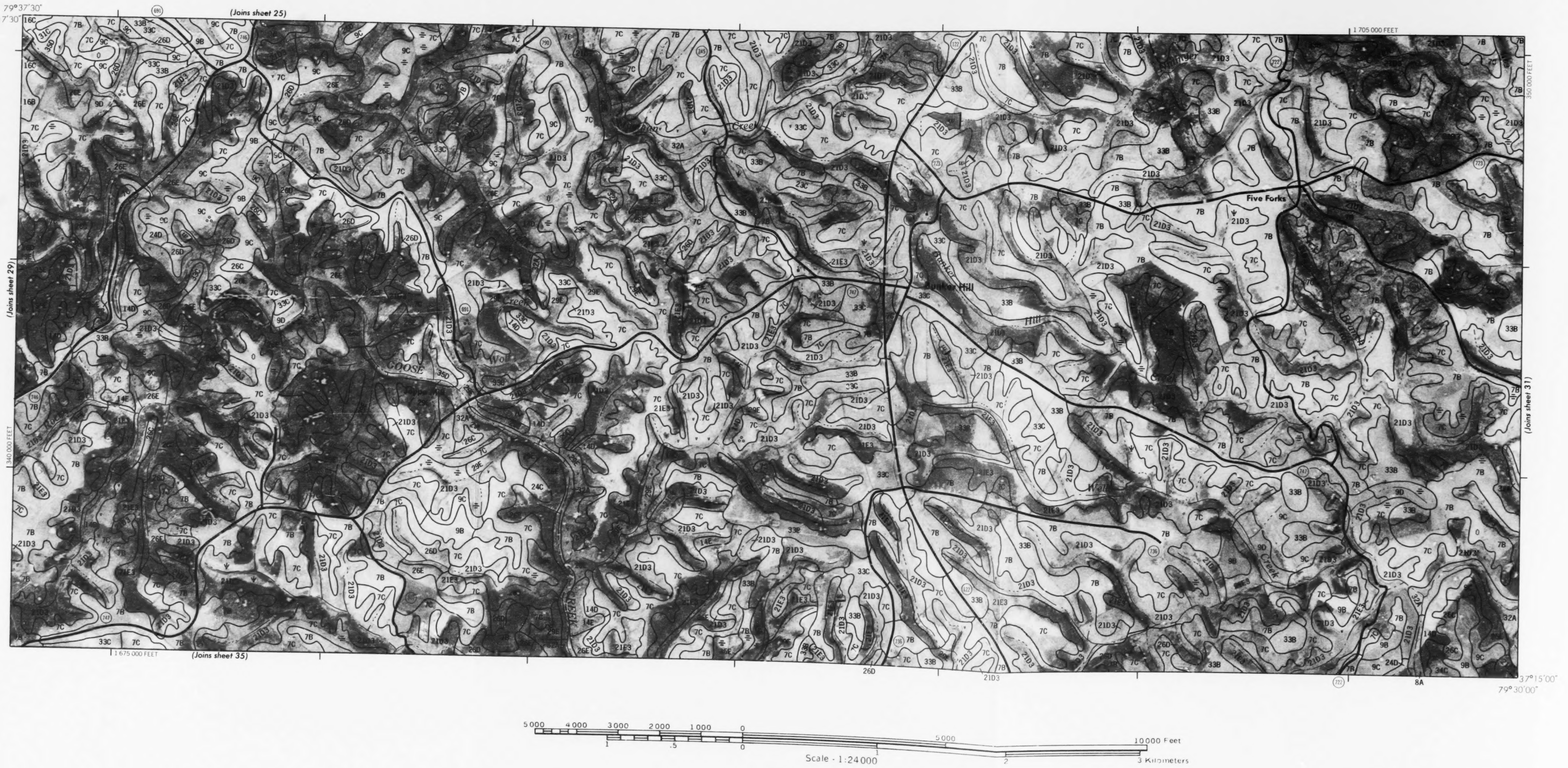

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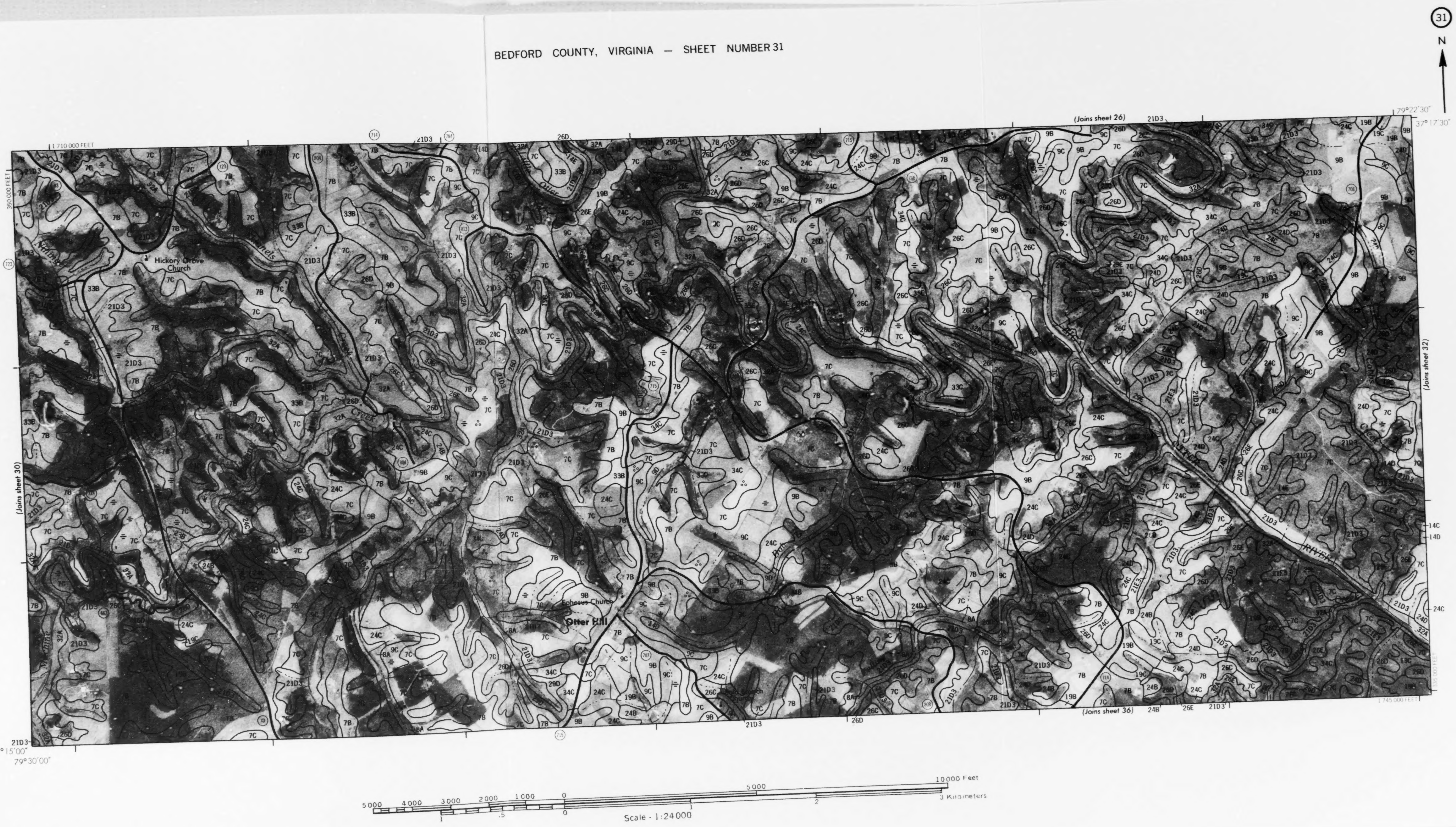

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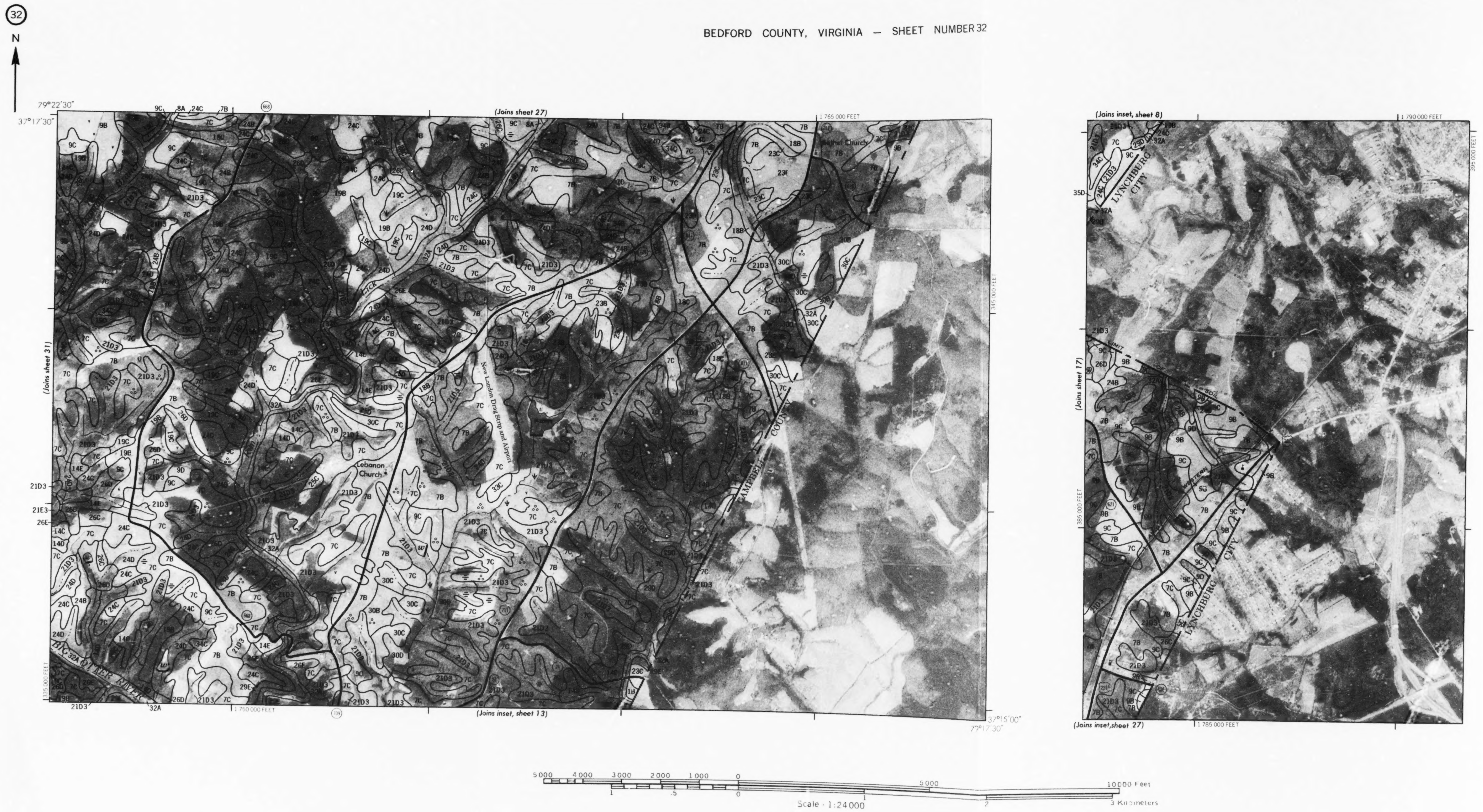

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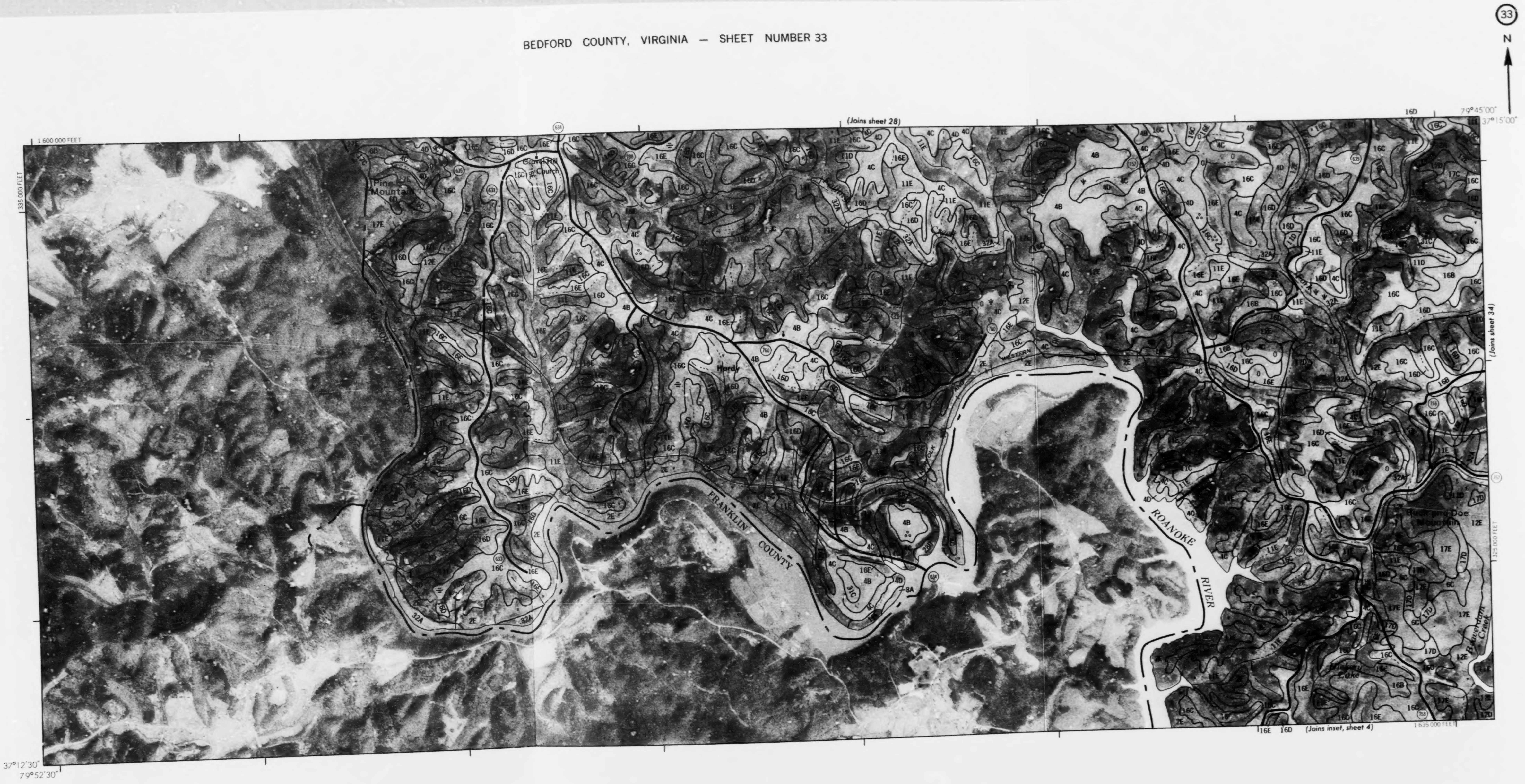

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1 .5 0 1 2 3 Kilometers

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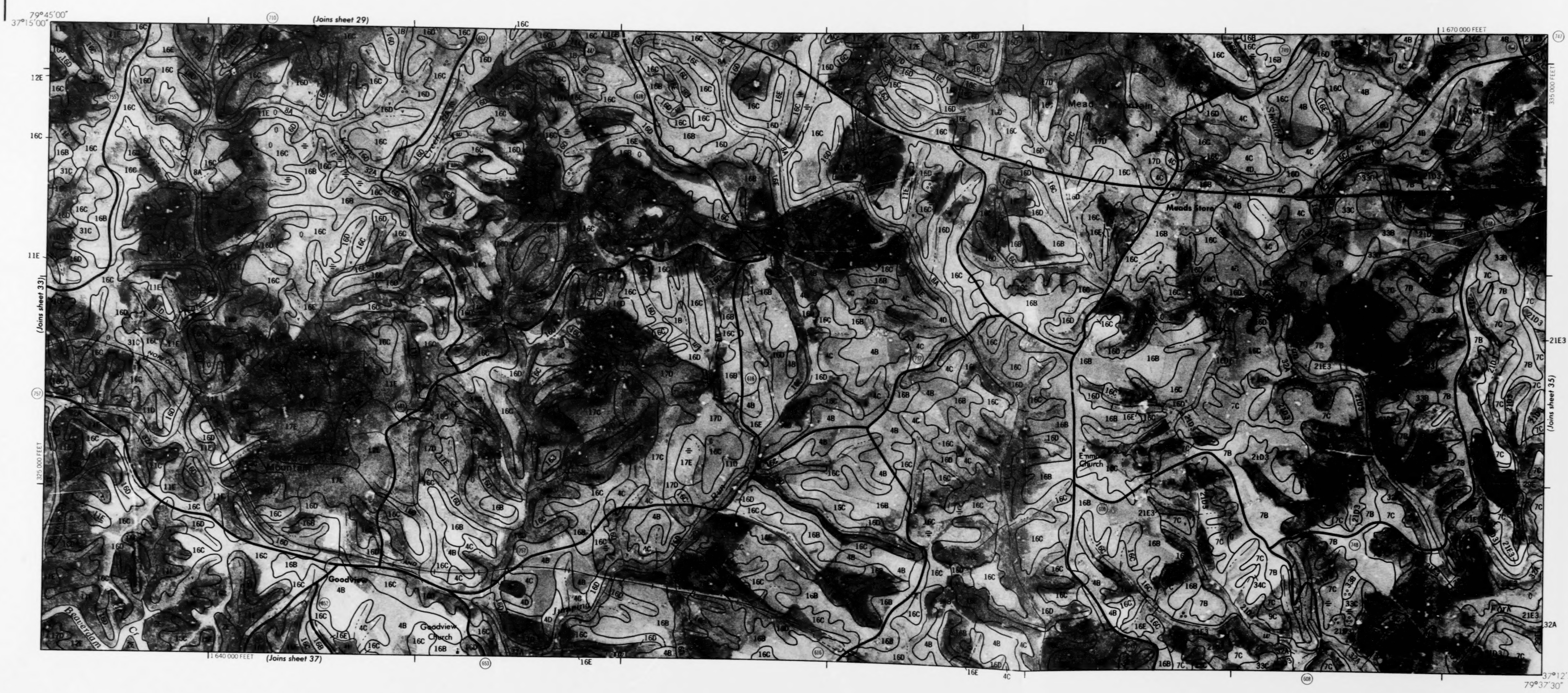

5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

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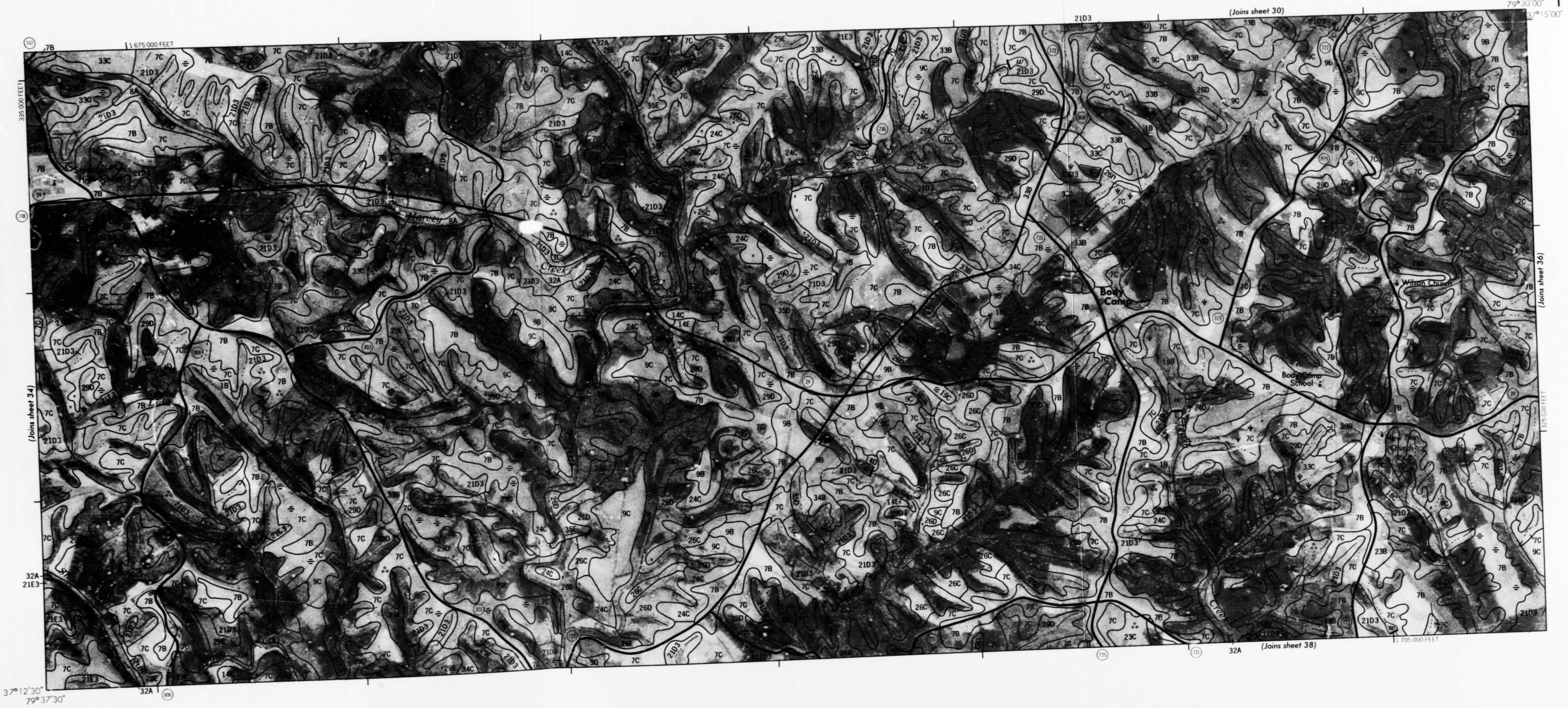
35

# BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 35



5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 Feet
1 .5 0 1 2 3 Kilometers

Scale - 1:24 000

BEDFORD COUNTY, VIRGINIA NO. 35

best copy available

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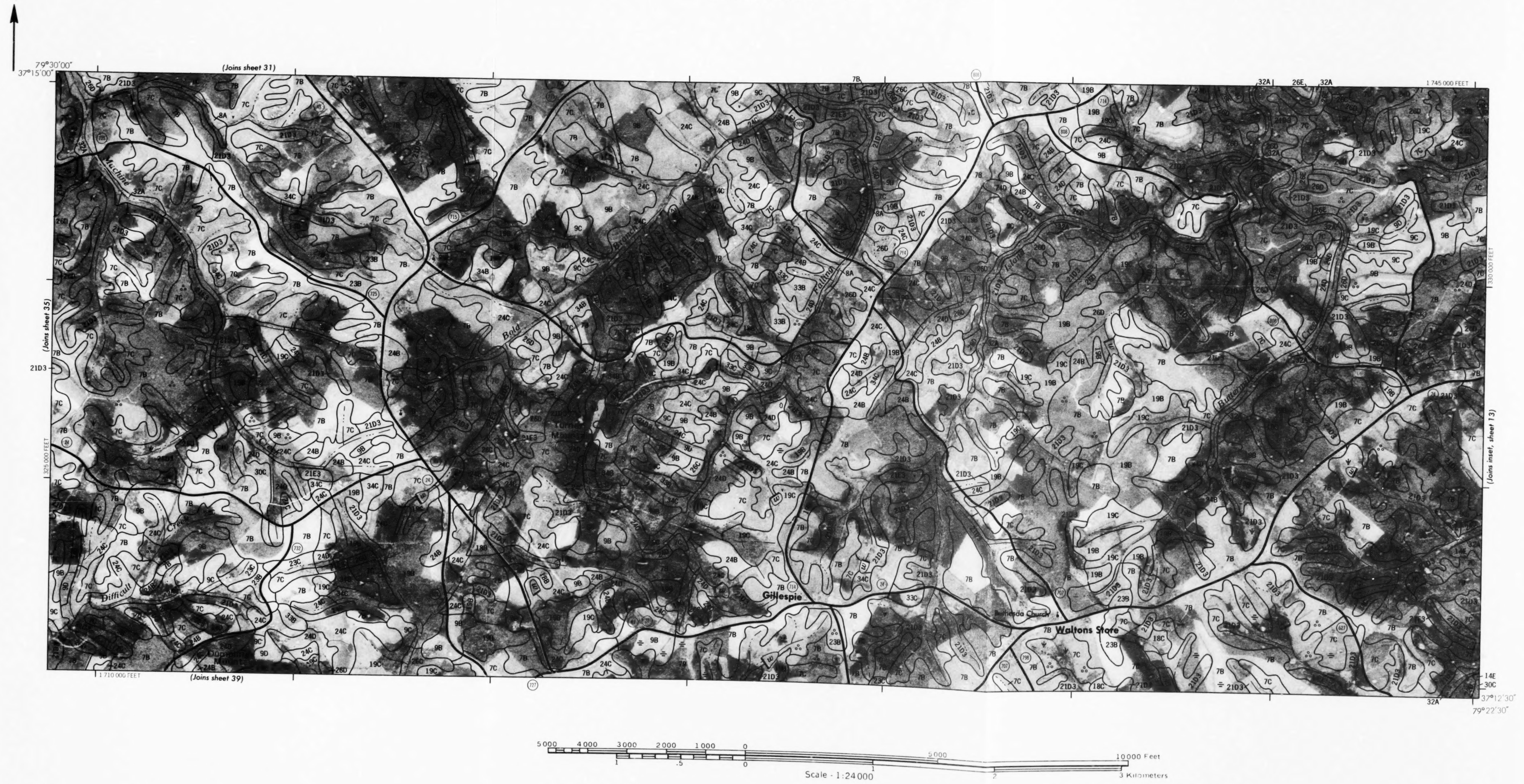
BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 36



best copy available

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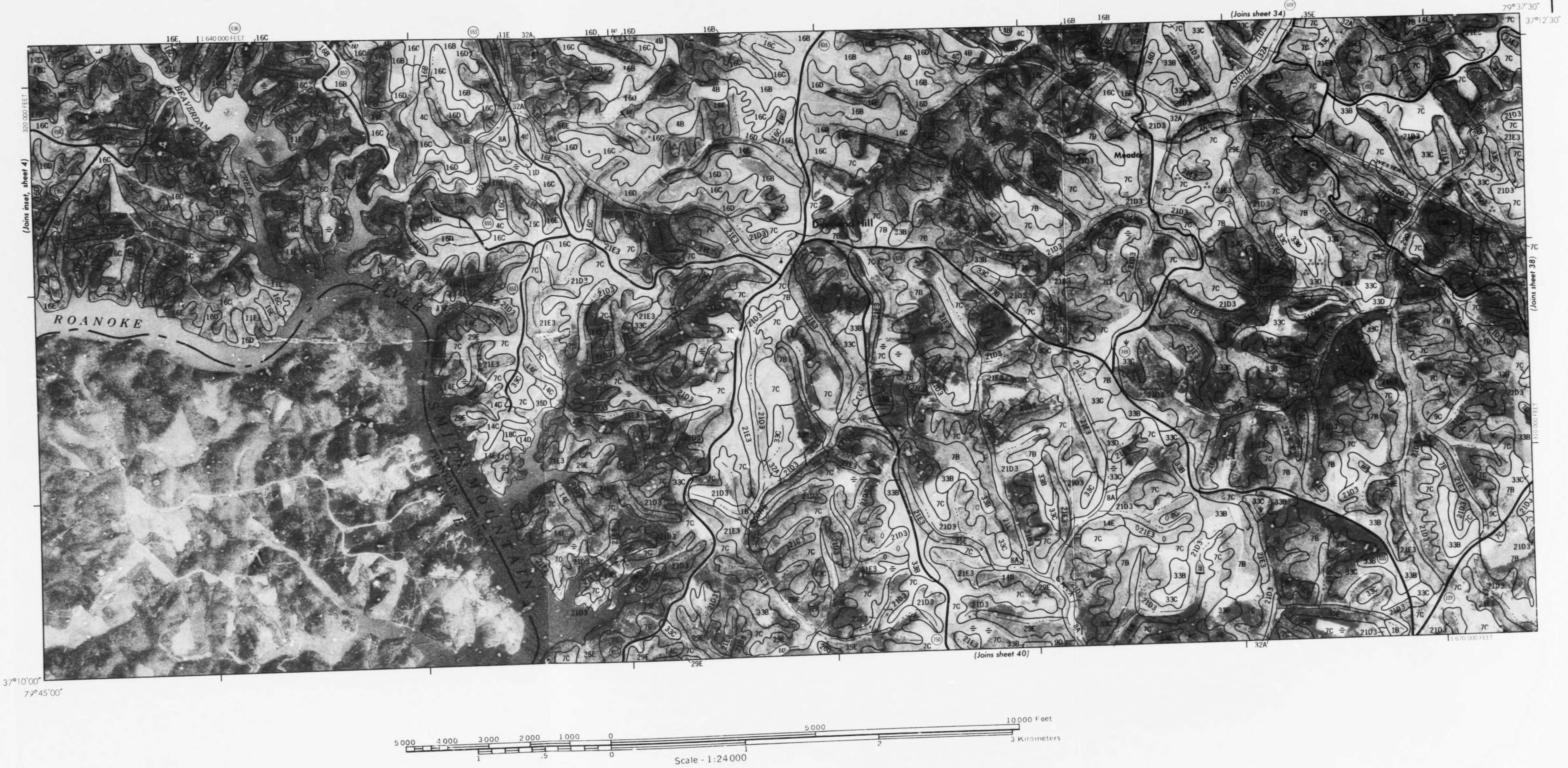
BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 37



Scale - 1:24000

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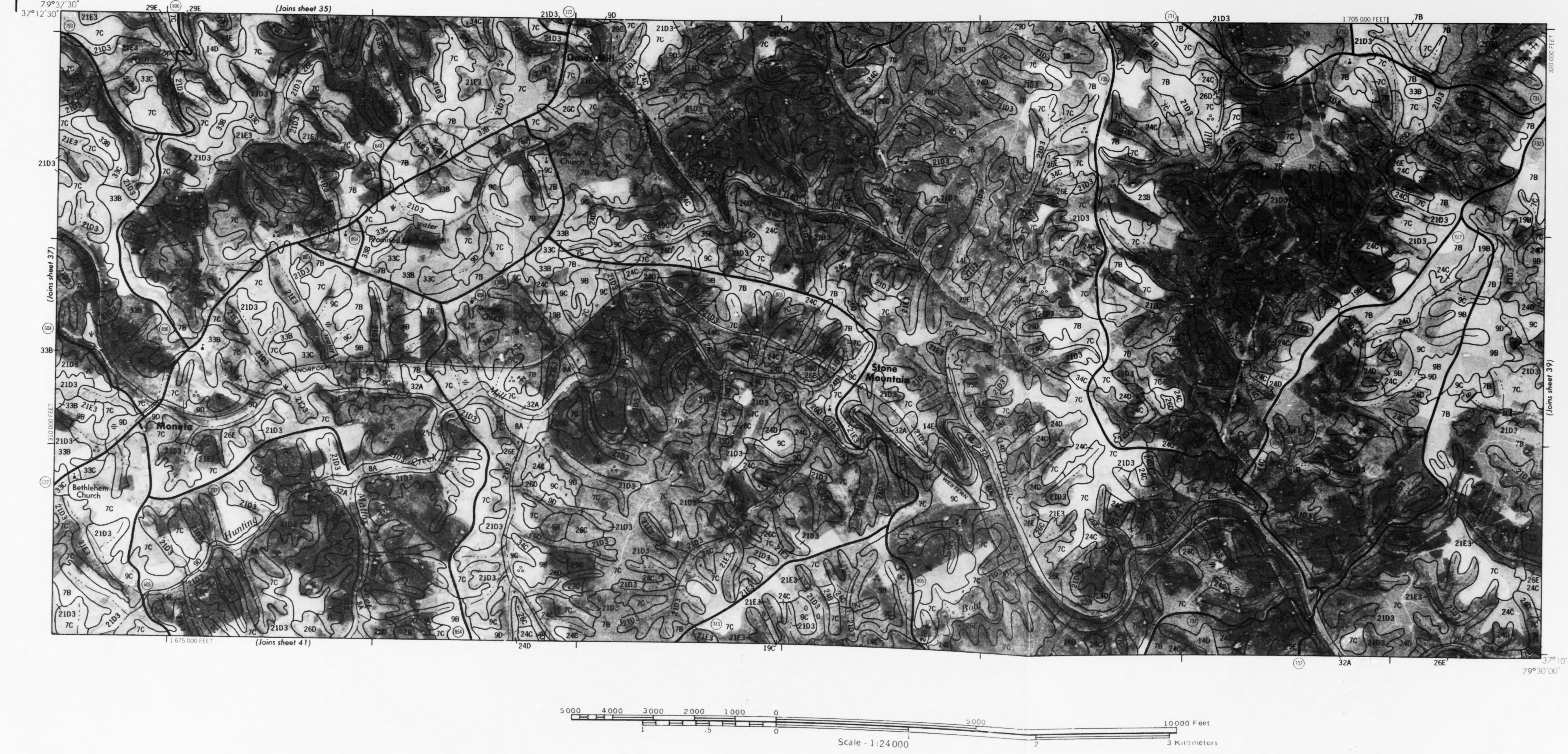
38

# BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 38



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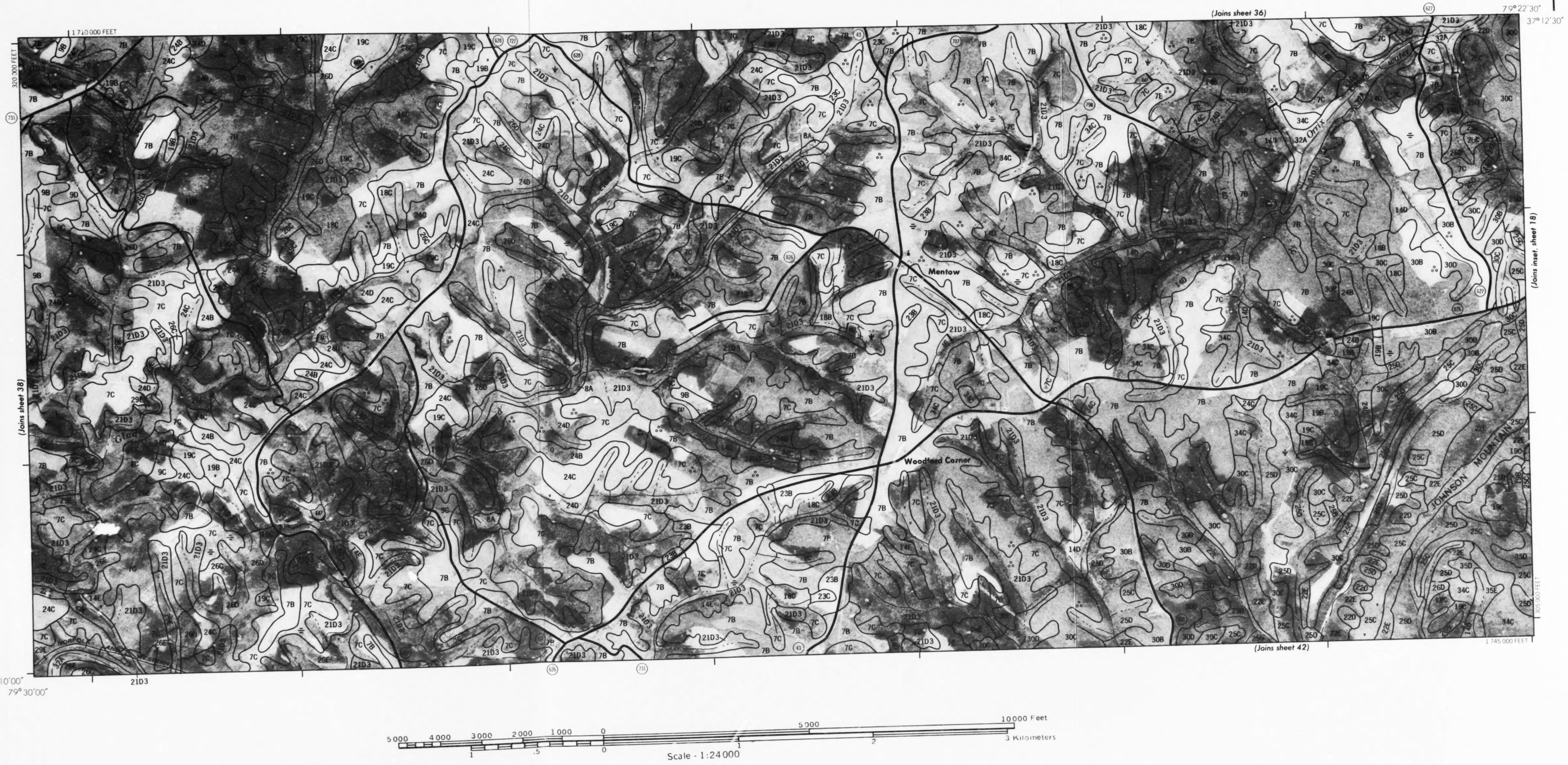
BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 39

N



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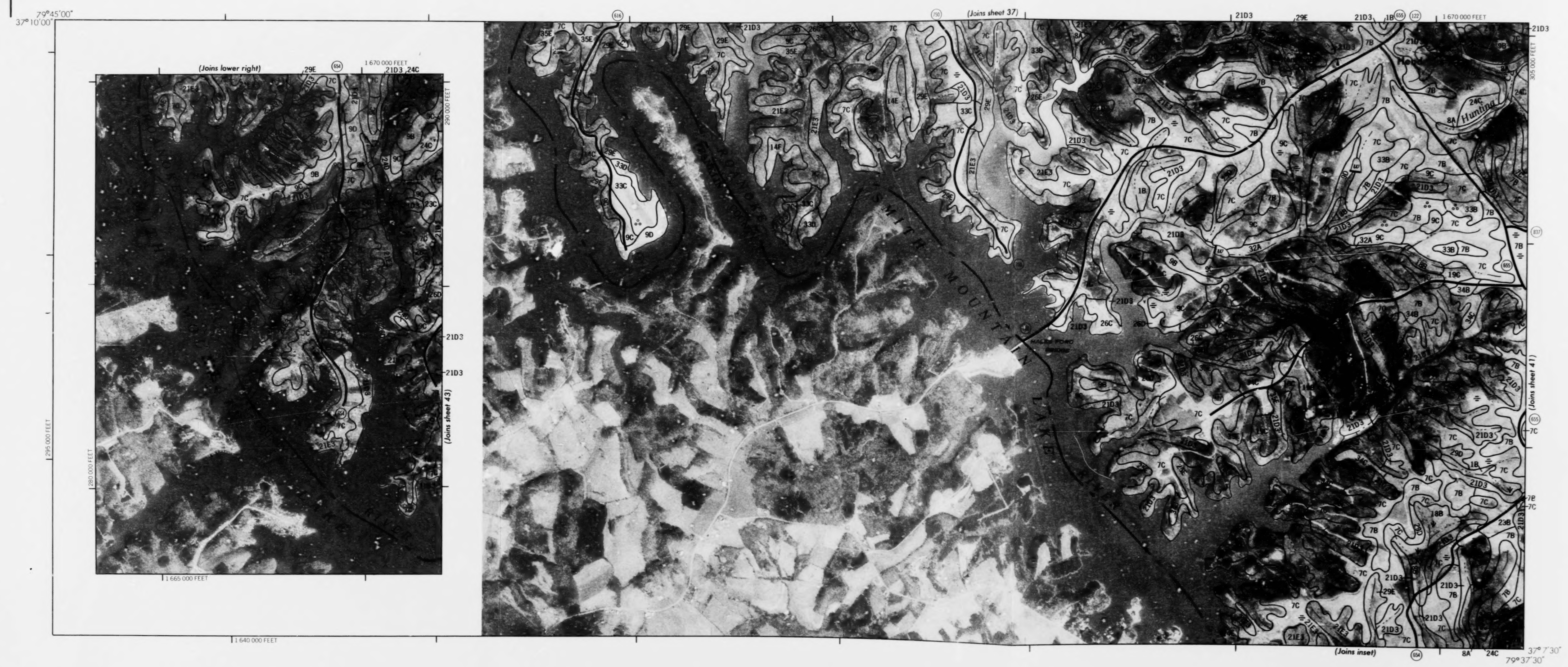
BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 40



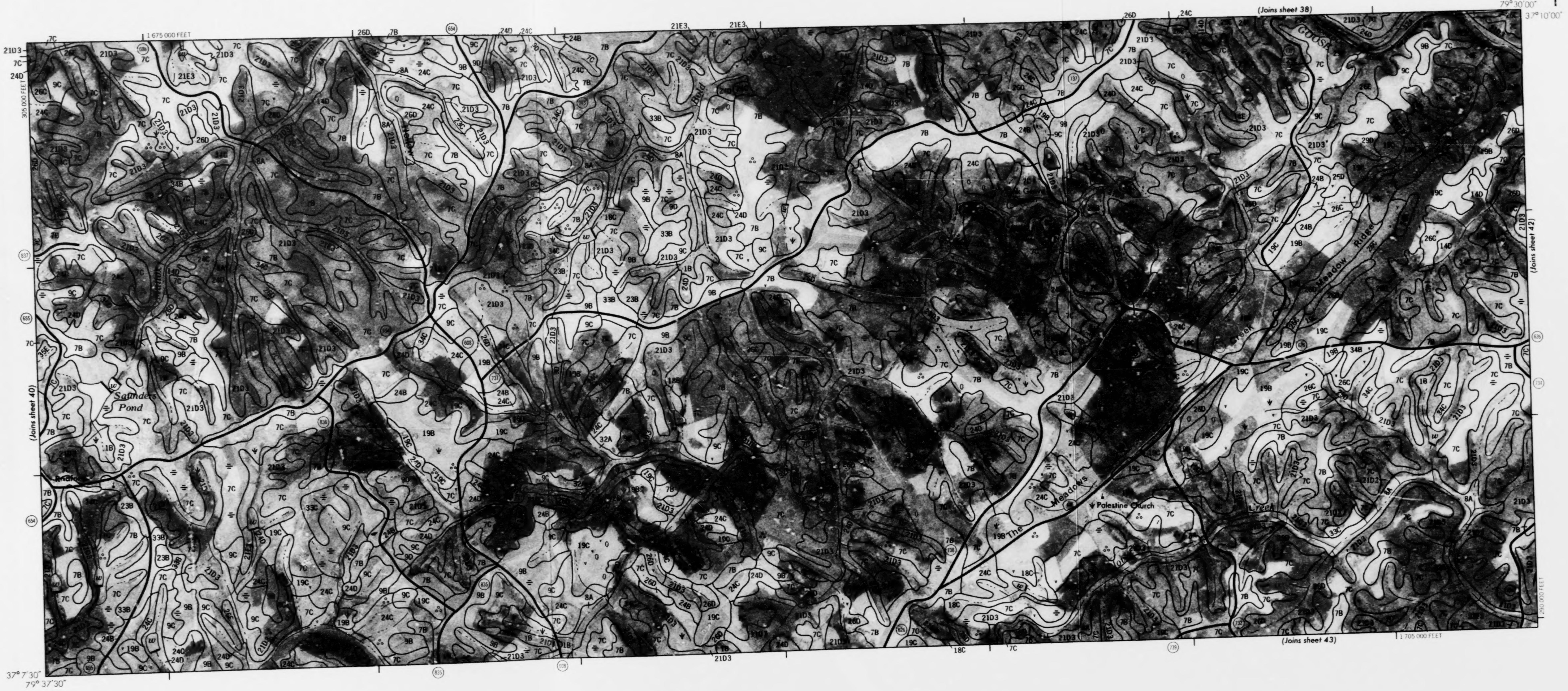
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

best copy available

41

N

BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 41



5000 4000 3000 2000 1000 0 5000 10000 Feet

1 .5 0 1 2 3 Kilometers

Scale - 1:24000

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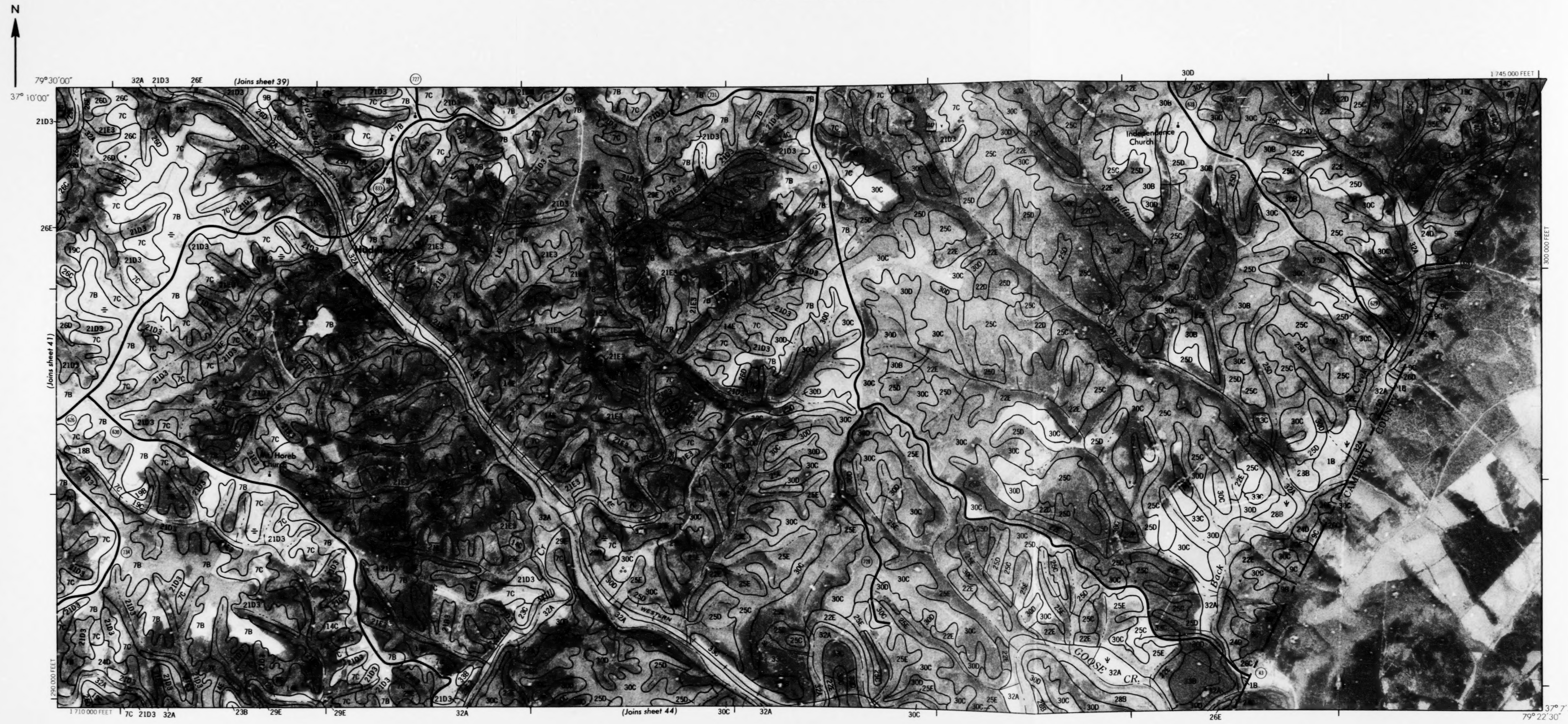
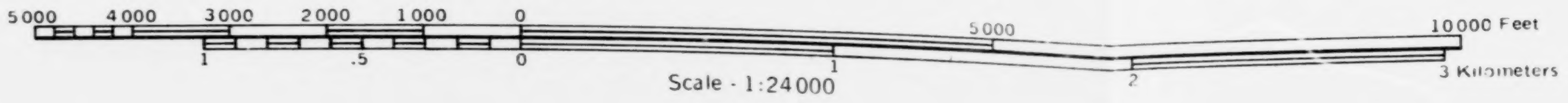
BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 42





Scale - 1:24000

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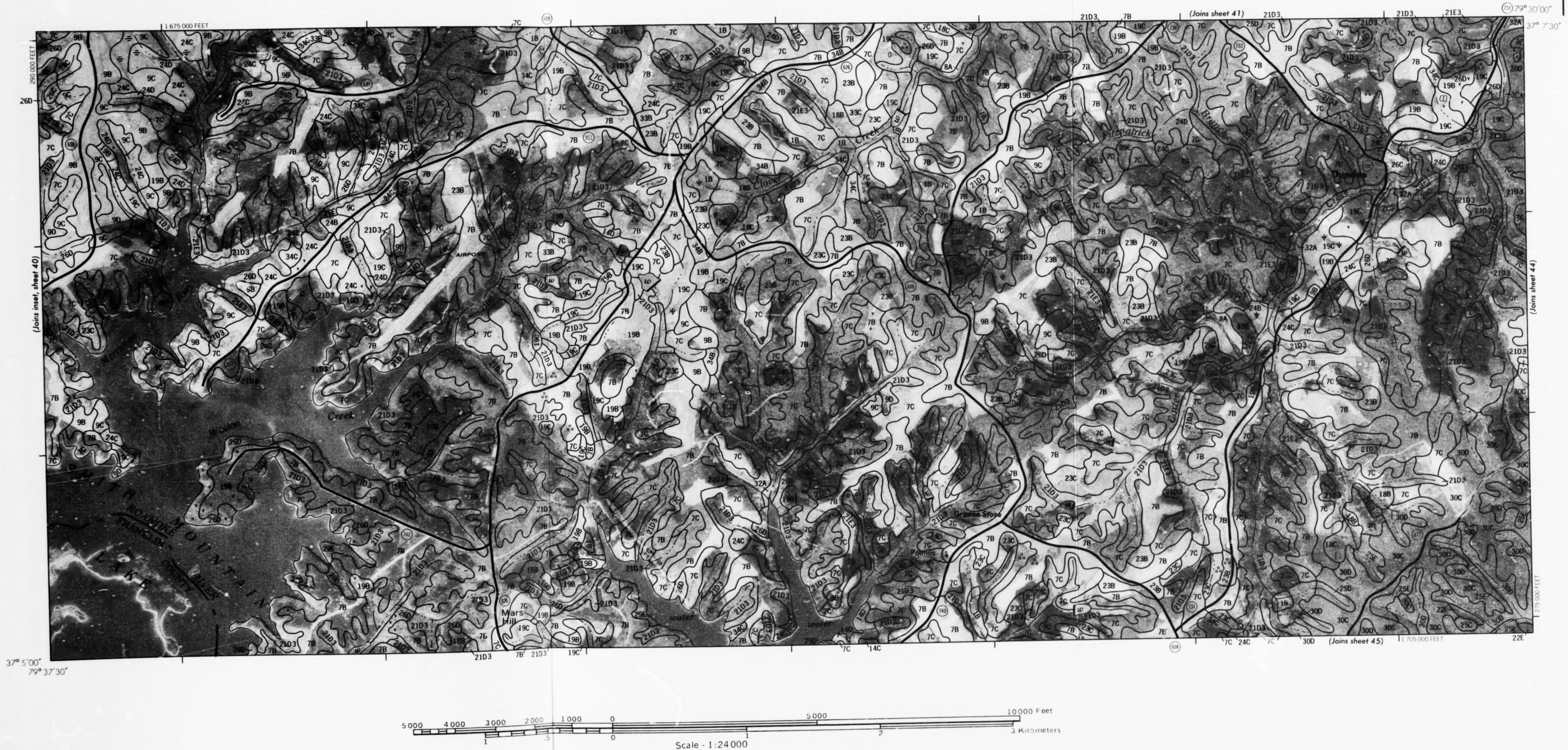
# BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 43



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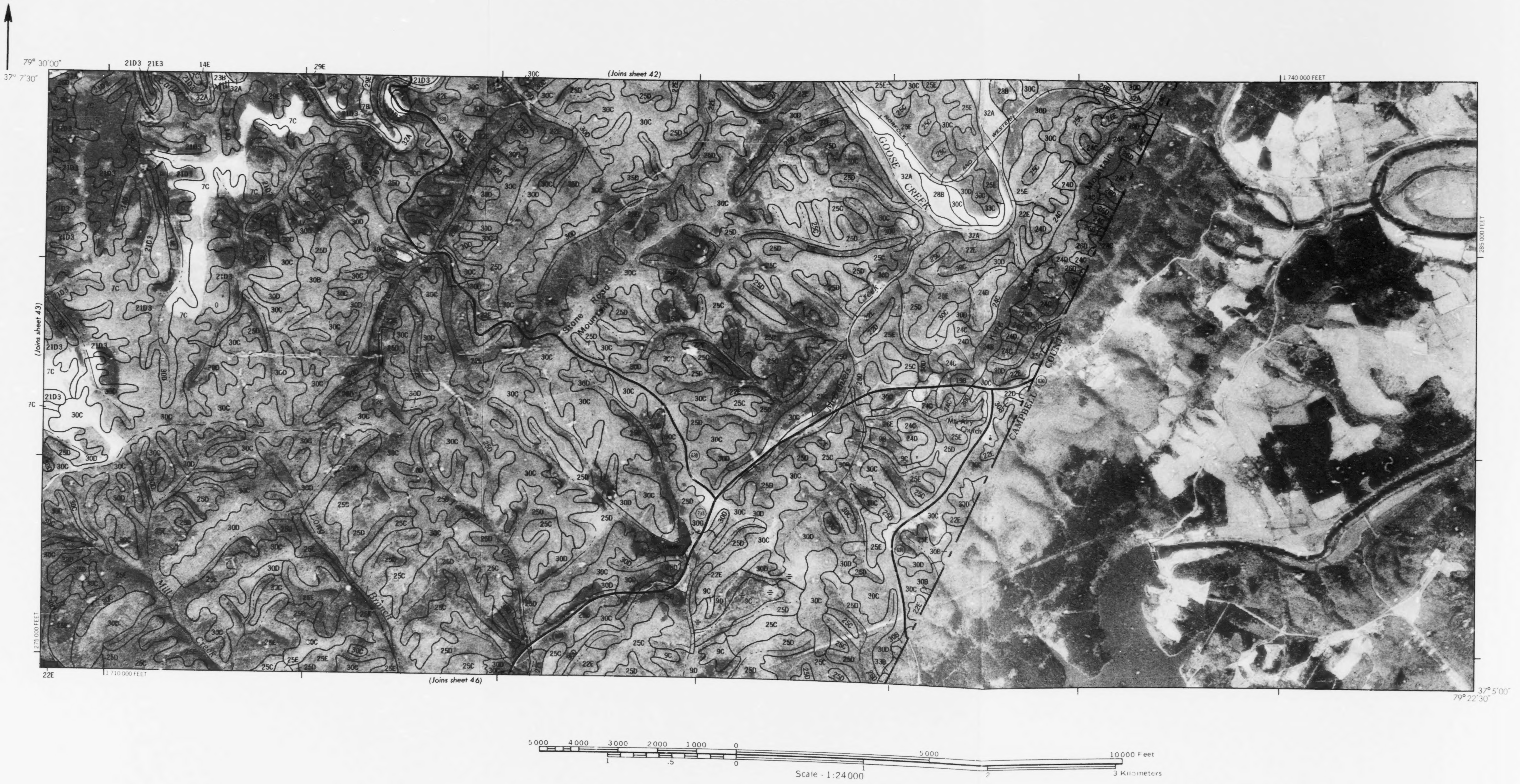
BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 44



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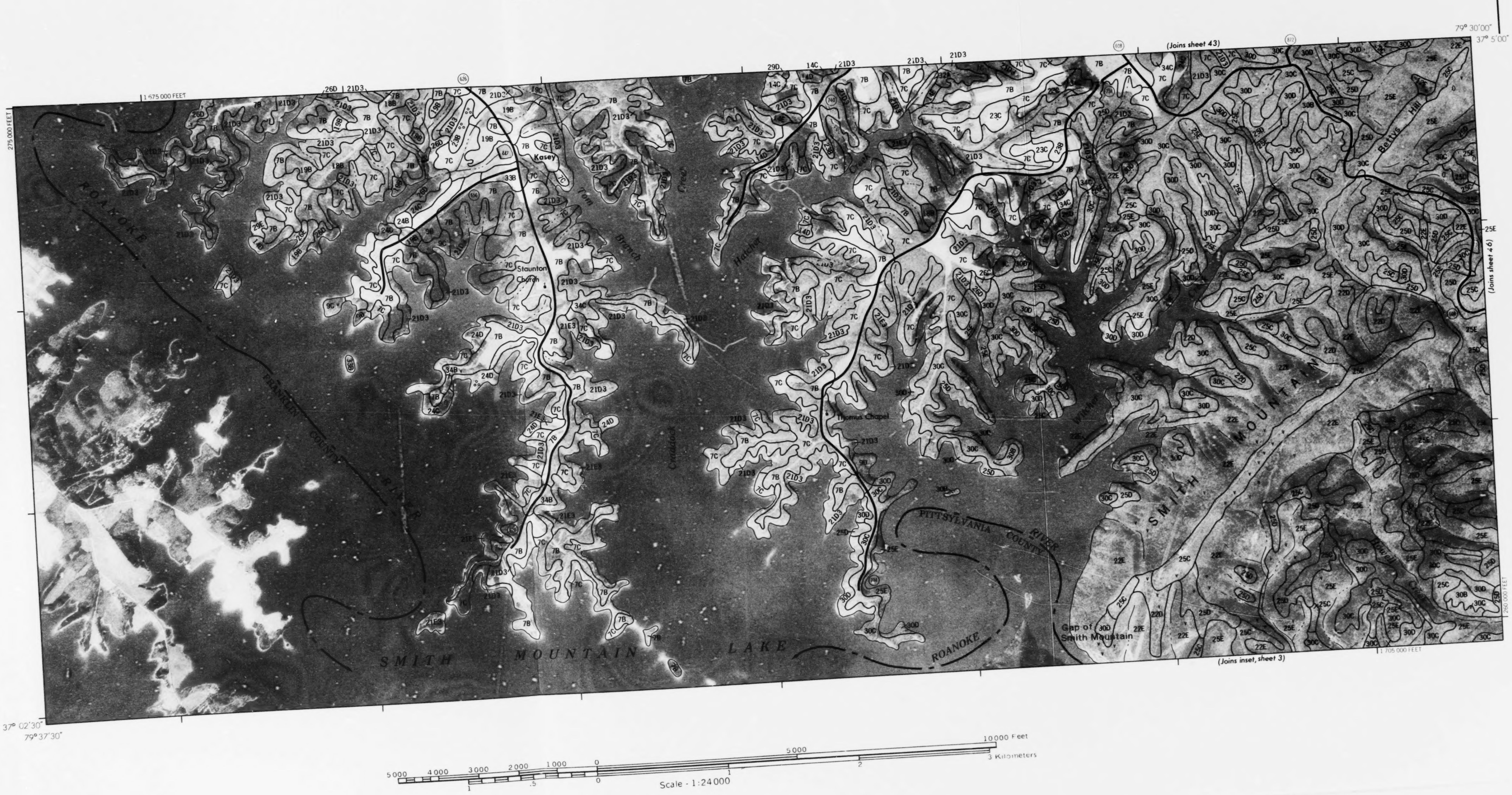
BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 45



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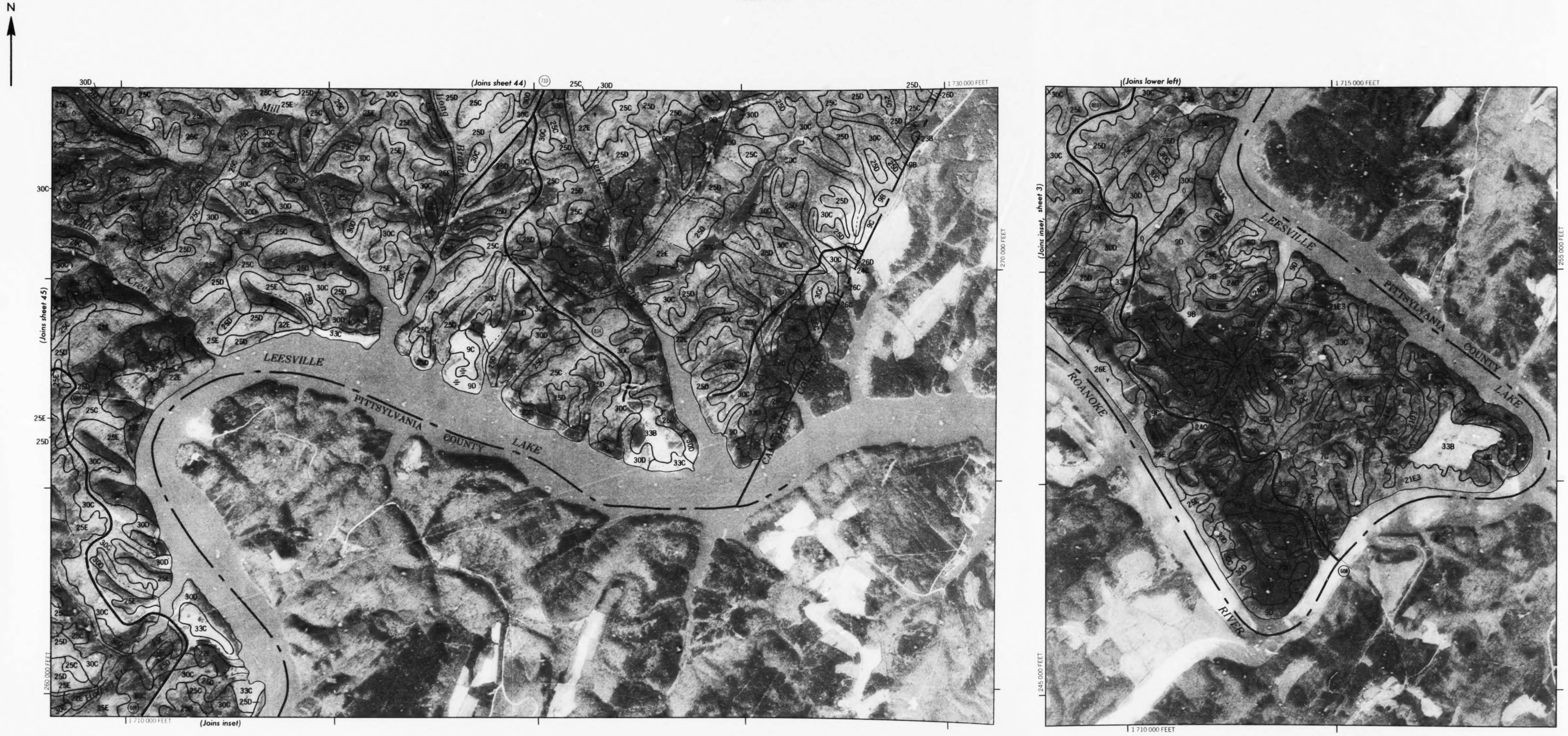
# BEDFORD COUNTY, VIRGINIA — SHEET NUMBER 46



5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

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